

AVIATION WEEK

MAR. 29, 1954

50 CENTS

A MCGRAW-HILL PUBLICATION



GRUMMAN F3F



GRUMMAN COUGAR

THEN AND NOW



A score of years spans the Grumman F3F of the early thirties and today's Grumman Cougar. In performance a gulf separates them. Yet both have much in common. Grumman research gave the F3F a retractable landing gear and superior top speed. This same research, but now geared to solve the intricate problems of transonic speeds, helped put swept-wing jet Cougars in operations on carriers when Navy squadrons needed them.

GRUMMAN AIRCRAFT ENGINEERING CORPORATION BETHPAGE
DESIGNERS AND BUILDERS ALSO OF THE SZF-1 SUB-KILLER, THE ALBATROSS TRIPHIBIA. METAL B.

VISIBILITY **by Swedlow** IN THE RYAN 72 SIDE-BY-SIDE TRAINER



The Ryan side-by-side Model 72 trainer marks a notable forward step in both safety and effectiveness. The old tandem-type trainer may block the instructor's vision at critical moments. In the Model 72 both instructor and student have complete visibility in all directions, assured by the perfect optical properties of the Swedlow-produced canopy. That is why the aircraft industry, where visibility is vital, unfailingly has recourse to Swedlow's specialized experience with transparent plastic glazing materials.



LOS ANGELES, CALIFORNIA • YOUNGSTOWN, OHIO

2,000 HOURS between engine overhauls



DELTA-C & S

For the first time in the history of the industry, the CAA has approved a 2,000-hour engine overhaul period. This authority has now been given to Delta-C & S for its Curtiss-Wright C1820 engines used in its Lockheed Constellations.

This new world standard of engine reliability is a tribute to the engine overhaul, line maintenance and flight personnel of Delta-C & S.

AeroShell Oil 120 is used exclusively in these Delta-C & S engines.



SHELL OIL COMPANY

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LINEATOR is years ahead



Lineator.

The Chance-Vought Cutlass was an advanced design in 1947. It is a leader today. The same is true of Anson's LINEATOR, which was developed for the Cutlass flight control system. Today, seven years later, there is not another "me" type linear actuator like it.

The new basic model is used on the latest of the Cutlass series, as in the McDonnell Ramjet Modifications of the Lineator are specified equipment in the McDonnell Thoron, an Air Force companion, F-101, and the Martin F5M patrol bomber.

Conforming to MIL-A-1064 (USAF), the LINEATOR is also adaptable where light weight and short length, for a given stroke, are desirable features. A full bearing unit, never makes it to handle 1500 lb. maximum operating load as either known or compression.

Anson has set the pace in the actuator field with advanced designs like the LINEATOR. As aircraft configurations change and speeds increase, count on Anson for more of the same. For information on the LINEATOR and other actuators, use our literature in the LAA Catalog.

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The Aviation Week March 29, 1954

Headline News

The Plans Arm of 4th Bomber Fielding 32
Curtis LeMay Ordered Weapons 32
Taylor Takes Over ANIO 34
F-2, Phantom Air, Production Given 34
USMC Cooks Eat, SAYS, Lunch 36
Navy Lays Out YF-102 Fighter Tactics 36
Navy Lays Out Security Requirements 38
S-1A, New Mark II, 38
Boswell Profiles AF War Day '54 38
First Production Transmittal on Air 38
Japan Air Industry Gets Muscle 38

Production

RAF Regain 104.2 High Production 32
Jet Lab to 540 Thompson Revolvers 36

Avionics

Weapon System Plan Outlined to DRE 40

Aviation Safety

Pilots Go to College for Safety 38

Air Transport

SAS European Transport Range Flight 38
CAF Patches Fight for CAF Wings 40
CAF Aids Greater London Region 40
Secret Airline Fled? 42
CAF, Navy's New YF-102 Conference 42
Red to 244 42
BPAC Plans London Change, Remotely 42
CAF Plans America Use, Changes 44
Tomball, on AN DC-7, Crew Team? 44

Editorials

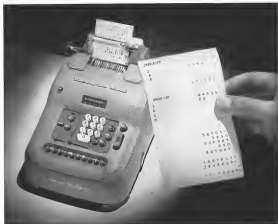
Charger Airline Trip Insurance 34
The Last Day, 1954 34
Weather Ships Say on the Job 34

Departments

New Design 31
Prime Time 31
Work Week 31
Industry Observer 31
Production Building 46
Ruler Confirms 46
For Wildlife 41
Teller Center 46
New Aviation Products 32
Also on the Market 32
CAF Orders 63
Southwest 63
Strictly Personal 63
Aviation Calendar 72

Picture Credits

2—Ewing; 10—Lipp; 11—Lipp; 12—Lipp; 13—Lipp; 14—Lipp; 15—Lipp; 16—Lipp; 17—Lipp; 18—Lipp; 19—Lipp; 20—Lipp; 21—Lipp; 22—Lipp; 23—Lipp; 24—Lipp; 25—Lipp; 26—Lipp; 27—Lipp; 28—Lipp; 29—Lipp; 30—Lipp; 31—Lipp; 32—Lipp; 33—Lipp; 34—Lipp; 35—Lipp; 36—Lipp; 37—Lipp; 38—Lipp; 39—Lipp; 40—Lipp; 41—Lipp; 42—Lipp; 43—Lipp; 44—Lipp; 45—Lipp; 46—Lipp; 47—Lipp; 48—Lipp; 49—Lipp; 50—Lipp; 51—Lipp; 52—Lipp; 53—Lipp; 54—Lipp; 55—Lipp; 56—Lipp; 57—Lipp; 58—Lipp; 59—Lipp; 60—Lipp; 61—Lipp; 62—Lipp; 63—Lipp; 64—Lipp; 65—Lipp; 66—Lipp; 67—Lipp; 68—Lipp; 69—Lipp; 70—Lipp; 71—Lipp; 72—Lipp; 73—Lipp; 74—Lipp; 75—Lipp; 76—Lipp; 77—Lipp; 78—Lipp; 79—Lipp; 80—Lipp; 81—Lipp; 82—Lipp; 83—Lipp; 84—Lipp; 85—Lipp; 86—Lipp; 87—Lipp; 88—Lipp; 89—Lipp; 90—Lipp; 91—Lipp; 92—Lipp; 93—Lipp; 94—Lipp; 95—Lipp; 96—Lipp; 97—Lipp; 98—Lipp; 99—Lipp; 100—Lipp; 101—Lipp; 102—Lipp; 103—Lipp; 104—Lipp; 105—Lipp; 106—Lipp; 107—Lipp; 108—Lipp; 109—Lipp; 110—Lipp; 111—Lipp; 112—Lipp; 113—Lipp; 114—Lipp; 115—Lipp; 116—Lipp; 117—Lipp; 118—Lipp; 119—Lipp; 120—Lipp; 121—Lipp; 122—Lipp; 123—Lipp; 124—Lipp; 125—Lipp; 126—Lipp; 127—Lipp; 128—Lipp; 129—Lipp; 130—Lipp; 131—Lipp; 132—Lipp; 133—Lipp; 134—Lipp; 135—Lipp; 136—Lipp; 137—Lipp; 138—Lipp; 139—Lipp; 140—Lipp; 141—Lipp; 142—Lipp; 143—Lipp; 144—Lipp; 145—Lipp; 146—Lipp; 147—Lipp; 148—Lipp; 149—Lipp; 150—Lipp; 151—Lipp; 152—Lipp; 153—Lipp; 154—Lipp; 155—Lipp; 156—Lipp; 157—Lipp; 158—Lipp; 159—Lipp; 160—Lipp; 161—Lipp; 162—Lipp; 163—Lipp; 164—Lipp; 165—Lipp; 166—Lipp; 167—Lipp; 168—Lipp; 169—Lipp; 170—Lipp; 171—Lipp; 172—Lipp; 173—Lipp; 174—Lipp; 175—Lipp; 176—Lipp; 177—Lipp; 178—Lipp; 179—Lipp; 180—Lipp; 181—Lipp; 182—Lipp; 183—Lipp; 184—Lipp; 185—Lipp; 186—Lipp; 187—Lipp; 188—Lipp; 189—Lipp; 190—Lipp; 191—Lipp; 192—Lipp; 193—Lipp; 194—Lipp; 195—Lipp; 196—Lipp; 197—Lipp; 198—Lipp; 199—Lipp; 200—Lipp; 201—Lipp; 202—Lipp; 203—Lipp; 204—Lipp; 205—Lipp; 206—Lipp; 207—Lipp; 208—Lipp; 209—Lipp; 210—Lipp; 211—Lipp; 212—Lipp; 213—Lipp; 214—Lipp; 215—Lipp; 216—Lipp; 217—Lipp; 218—Lipp; 219—Lipp; 220—Lipp; 221—Lipp; 222—Lipp; 223—Lipp; 224—Lipp; 225—Lipp; 226—Lipp; 227—Lipp; 228—Lipp; 229—Lipp; 230—Lipp; 231—Lipp; 232—Lipp; 233—Lipp; 234—Lipp; 235—Lipp; 236—Lipp; 237—Lipp; 238—Lipp; 239—Lipp; 240—Lipp; 241—Lipp; 242—Lipp; 243—Lipp; 244—Lipp; 245—Lipp; 246—Lipp; 247—Lipp; 248—Lipp; 249—Lipp; 250—Lipp; 251—Lipp; 252—Lipp; 253—Lipp; 254—Lipp; 255—Lipp; 256—Lipp; 257—Lipp; 258—Lipp; 259—Lipp; 260—Lipp; 261—Lipp; 262—Lipp; 263—Lipp; 264—Lipp; 265—Lipp; 266—Lipp; 267—Lipp; 268—Lipp; 269—Lipp; 270—Lipp; 271—Lipp; 272—Lipp; 273—Lipp; 274—Lipp; 275—Lipp; 276—Lipp; 277—Lipp; 278—Lipp; 279—Lipp; 280—Lipp; 281—Lipp; 282—Lipp; 283—Lipp; 284—Lipp; 285—Lipp; 286—Lipp; 287—Lipp; 288—Lipp; 289—Lipp; 290—Lipp; 291—Lipp; 292—Lipp; 293—Lipp; 294—Lipp; 295—Lipp; 296—Lipp; 297—Lipp; 298—Lipp; 299—Lipp; 300—Lipp; 301—Lipp; 302—Lipp; 303—Lipp; 304—Lipp; 305—Lipp; 306—Lipp; 307—Lipp; 308—Lipp; 309—Lipp; 310—Lipp; 311—Lipp; 312—Lipp; 313—Lipp; 314—Lipp; 315—Lipp; 316—Lipp; 317—Lipp; 318—Lipp; 319—Lipp; 320—Lipp; 321—Lipp; 322—Lipp; 323—Lipp; 324—Lipp; 325—Lipp; 326—Lipp; 327—Lipp; 328—Lipp; 329—Lipp; 330—Lipp; 331—Lipp; 332—Lipp; 333—Lipp; 334—Lipp; 335—Lipp; 336—Lipp; 337—Lipp; 338—Lipp; 339—Lipp; 340—Lipp; 341—Lipp; 342—Lipp; 343—Lipp; 344—Lipp; 345—Lipp; 346—Lipp; 347—Lipp; 348—Lipp; 349—Lipp; 350—Lipp; 351—Lipp; 352—Lipp; 353—Lipp; 354—Lipp; 355—Lipp; 356—Lipp; 357—Lipp; 358—Lipp; 359—Lipp; 360—Lipp; 361—Lipp; 362—Lipp; 363—Lipp; 364—Lipp; 365—Lipp; 366—Lipp; 367—Lipp; 368—Lipp; 369—Lipp; 370—Lipp; 371—Lipp; 372—Lipp; 373—Lipp; 374—Lipp; 375—Lipp; 376—Lipp; 377—Lipp; 378—Lipp; 379—Lipp; 380—Lipp; 381—Lipp; 382—Lipp; 383—Lipp; 384—Lipp; 385—Lipp; 386—Lipp; 387—Lipp; 388—Lipp; 389—Lipp; 390—Lipp; 391—Lipp; 392—Lipp; 393—Lipp; 394—Lipp; 395—Lipp; 396—Lipp; 397—Lipp; 398—Lipp; 399—Lipp; 400—Lipp; 401—Lipp; 402—Lipp; 403—Lipp; 404—Lipp; 405—Lipp; 406—Lipp; 407—Lipp; 408—Lipp; 409—Lipp; 410—Lipp; 411—Lipp; 412—Lipp; 413—Lipp; 414—Lipp; 415—Lipp; 416—Lipp; 417—Lipp; 418—Lipp; 419—Lipp; 420—Lipp; 421—Lipp; 422—Lipp; 423—Lipp; 424—Lipp; 425—Lipp; 426—Lipp; 427—Lipp; 428—Lipp; 429—Lipp; 430—Lipp; 431—Lipp; 432—Lipp; 433—Lipp; 434—Lipp; 435—Lipp; 436—Lipp; 437—Lipp; 438—Lipp; 439—Lipp; 440—Lipp; 441—Lipp; 442—Lipp; 443—Lipp; 444—Lipp; 445—Lipp; 446—Lipp; 447—Lipp; 448—Lipp; 449—Lipp; 450—Lipp; 451—Lipp; 452—Lipp; 453—Lipp; 454—Lipp; 455—Lipp; 456—Lipp; 457—Lipp; 458—Lipp; 459—Lipp; 460—Lipp; 461—Lipp; 462—Lipp; 463—Lipp; 464—Lipp; 465—Lipp; 466—Lipp; 467—Lipp; 468—Lipp; 469—Lipp; 470—Lipp; 471—Lipp; 472—Lipp; 473—Lipp; 474—Lipp; 475—Lipp; 476—Lipp; 477—Lipp; 478—Lipp; 479—Lipp; 480—Lipp; 481—Lipp; 482—Lipp; 483—Lipp; 484—Lipp; 485—Lipp; 486—Lipp; 487—Lipp; 488—Lipp; 489—Lipp; 490—Lipp; 491—Lipp; 492—Lipp; 493—Lipp; 494—Lipp; 495—Lipp; 496—Lipp; 497—Lipp; 498—Lipp; 499—Lipp; 500—Lipp; 501—Lipp; 502—Lipp; 503—Lipp; 504—Lipp; 505—Lipp; 506—Lipp; 507—Lipp; 508—Lipp; 509—Lipp; 510—Lipp; 511—Lipp; 512—Lipp; 513—Lipp; 514—Lipp; 515—Lipp; 516—Lipp; 517—Lipp; 518—Lipp; 519—Lipp; 520—Lipp; 521—Lipp; 522—Lipp; 523—Lipp; 524—Lipp; 525—Lipp; 526—Lipp; 527—Lipp; 528—Lipp; 529—Lipp; 530—Lipp; 531—Lipp; 532—Lipp; 533—Lipp; 534—Lipp; 535—Lipp; 536—Lipp; 537—Lipp; 538—Lipp; 539—Lipp; 540—Lipp; 541—Lipp; 542—Lipp; 543—Lipp; 544—Lipp; 545—Lipp; 546—Lipp; 547—Lipp; 548—Lipp; 549—Lipp; 550—Lipp; 551—Lipp; 552—Lipp; 553—Lipp; 554—Lipp; 555—Lipp; 556—Lipp; 557—Lipp; 558—Lipp; 559—Lipp; 560—Lipp; 561—Lipp; 562—Lipp; 563—Lipp; 564—Lipp; 565—Lipp; 566—Lipp; 567—Lipp; 568—Lipp; 569—Lipp; 570—Lipp; 571—Lipp; 572—Lipp; 573—Lipp; 574—Lipp; 575—Lipp; 576—Lipp; 577—Lipp; 578—Lipp; 579—Lipp; 580—Lipp; 581—Lipp; 582—Lipp; 583—Lipp; 584—Lipp; 585—Lipp; 586—Lipp; 587—Lipp; 588—Lipp; 589—Lipp; 590—Lipp; 591—Lipp; 592—Lipp; 593—Lipp; 594—Lipp; 595—Lipp; 596—Lipp; 597—Lipp; 598—Lipp; 599—Lipp; 600—Lipp; 601—Lipp; 602—Lipp; 603—Lipp; 604—Lipp; 605—Lipp; 606—Lipp; 607—Lipp; 608—Lipp; 609—Lipp; 610—Lipp; 611—Lipp; 612—Lipp; 613—Lipp; 614—Lipp; 615—Lipp; 616—Lipp; 617—Lipp; 618—Lipp; 619—Lipp; 620—Lipp; 621—Lipp; 622—Lipp; 623—Lipp; 624—Lipp; 625—Lipp; 626—Lipp; 627—Lipp; 628—Lipp; 629—Lipp; 630—Lipp; 631—Lipp; 632—Lipp; 633—Lipp; 634—Lipp; 635—Lipp; 636—Lipp; 637—Lipp; 638—Lipp; 639—Lipp; 640—Lipp; 641—Lipp; 642—Lipp; 643—Lipp; 644—Lipp; 645—Lipp; 646—Lipp; 647—Lipp; 648—Lipp; 649—Lipp; 650—Lipp; 651—Lipp; 652—Lipp; 653—Lipp; 654—Lipp; 655—Lipp; 656—Lipp; 657—Lipp; 658—Lipp; 659—Lipp; 660—Lipp; 661—Lipp; 662—Lipp; 663—Lipp; 664—Lipp; 665—Lipp; 666—Lipp; 667—Lipp; 668—Lipp; 669—Lipp; 670—Lipp; 671—Lipp; 672—Lipp; 673—Lipp; 674—Lipp; 675—Lipp; 676—Lipp; 677—Lipp; 678—Lipp; 679—Lipp; 680—Lipp; 681—Lipp; 682—Lipp; 683—Lipp; 684—Lipp; 685—Lipp; 686—Lipp; 687—Lipp; 688—Lipp; 689—Lipp; 690—Lipp; 691—Lipp; 692—Lipp; 693—Lipp; 694—Lipp; 695—Lipp; 696—Lipp; 697—Lipp; 698—Lipp; 699—Lipp; 700—Lipp; 701—Lipp; 702—Lipp; 703—Lipp; 704—Lipp; 705—Lipp; 706—Lipp; 707—Lipp; 708—Lipp; 709—Lipp; 710—Lipp; 711—Lipp; 712—Lipp; 713—Lipp; 714—Lipp; 715—Lipp; 716—Lipp; 717—Lipp; 718—Lipp; 719—Lipp; 720—Lipp; 721—Lipp; 722—Lipp; 723—Lipp; 724—Lipp; 725—Lipp; 726—Lipp; 727—Lipp; 728—Lipp; 729—Lipp; 730—Lipp; 731—Lipp; 732—Lipp; 733—Lipp; 734—Lipp; 735—Lipp; 736—Lipp; 737—Lipp; 738—Lipp; 739—Lipp; 740—Lipp; 741—Lipp; 742—Lipp; 743—Lipp; 744—Lipp; 745—Lipp; 746—Lipp; 747—Lipp; 748—Lipp; 749—Lipp; 750—Lipp; 751—Lipp; 752—Lipp; 753—Lipp; 754—Lipp; 755—Lipp; 756—Lipp; 757—Lipp; 758—Lipp; 759—Lipp; 760—Lipp; 761—Lipp; 762—Lipp; 763—Lipp; 764—Lipp; 765—Lipp; 766—Lipp; 767—Lipp; 768—Lipp; 769—Lipp; 770—Lipp; 771—Lipp; 772—Lipp; 773—Lipp; 774—Lipp; 775—Lipp; 776—Lipp; 777—Lipp; 778—Lipp; 779—Lipp; 780—Lipp; 781—Lipp; 782—Lipp; 783—Lipp; 784—Lipp; 785—Lipp; 786—Lipp; 787—Lipp; 788—Lipp; 789—Lipp; 790—Lipp; 791—Lipp; 792—Lipp; 793—Lipp; 794—Lipp; 795—Lipp; 796—Lipp; 797—Lipp; 798—Lipp; 799—Lipp; 800—Lipp; 801—Lipp; 802—Lipp; 803—Lipp; 804—Lipp; 805—Lipp; 806—Lipp; 807—Lipp; 808—Lipp; 809—Lipp; 810—Lipp; 811—Lipp; 812—Lipp; 813—Lipp; 814—Lipp; 815—Lipp; 816—Lipp; 817—Lipp; 818—Lipp; 819—Lipp; 820—Lipp; 821—Lipp; 822—Lipp; 823—Lipp; 824—Lipp; 825—Lipp; 826—Lipp; 827—Lipp; 828—Lipp; 829—Lipp; 830—Lipp; 831—Lipp; 832—Lipp; 833—Lipp; 834—Lipp; 835—Lipp; 836—Lipp; 837—Lipp; 838—Lipp; 839—Lipp; 840—Lipp; 841—Lipp; 842—Lipp; 843—Lipp; 844—Lipp; 845—Lipp; 846—Lipp; 847—Lipp; 848—Lipp; 849—Lipp; 850—Lipp; 851—Lipp; 852—Lipp; 853—Lipp; 854—Lipp; 855—Lipp; 856—Lipp; 857—Lipp; 858—Lipp; 859—Lipp; 860—Lipp; 861—Lipp; 862—Lipp; 863—Lipp; 864—Lipp; 865—Lipp; 866—Lipp; 867—Lipp; 868—Lipp; 869—Lipp; 870—Lipp; 871—Lipp; 872—Lipp; 873—Lipp; 874—Lipp; 875—Lipp; 876—Lipp; 877—Lipp; 878—Lipp; 879—Lipp; 880—Lipp; 881—Lipp; 882—Lipp; 883—Lipp; 884—Lipp; 885—Lipp; 886—Lipp; 887—Lipp; 888—Lipp; 889—Lipp; 890—Lipp; 891—Lipp; 892—Lipp; 893—Lipp; 894—Lipp; 895—Lipp; 896—Lipp; 897—Lipp; 898—Lipp; 899—Lipp; 900—Lipp; 901—Lipp; 902—Lipp; 903—Lipp; 904—Lipp; 905—Lipp; 906—Lipp; 907—Lipp; 908—Lipp; 909—Lipp; 910—Lipp; 911—Lipp; 912—Lipp; 913—Lipp; 914—Lipp; 915—Lipp; 916—Lipp; 917—Lipp; 918—Lipp; 919—Lipp; 920—Lipp; 921—Lipp; 922—Lipp; 923—Lipp; 924—Lipp; 925—Lipp; 926—Lipp; 927—Lipp; 928—Lipp; 929—Lipp; 930—Lipp; 931—Lipp; 932—Lipp; 933—Lipp; 934—Lipp; 935—Lipp; 936—Lipp; 937—Lipp; 938—Lipp; 939—Lipp; 940—Lipp; 941—Lipp; 942—Lipp; 943—Lipp; 944—Lipp; 945—Lipp; 946—Lipp; 947—Lipp; 948—Lipp; 949—Lipp; 950—Lipp; 951—Lipp; 952—Lipp; 953—Lipp; 954—Lipp; 955—Lipp; 956—Lipp; 957—Lipp; 958—Lipp; 959—Lipp; 960—Lipp; 961—Lipp; 962—Lipp; 963—Lipp; 964—Lipp; 965—Lipp; 966—Lipp; 967—Lipp; 968—Lipp; 969—Lipp; 970—Lipp; 971—Lipp; 972—Lipp; 973—Lipp; 974—Lipp; 975—Lipp; 976—Lipp; 977—Lipp; 978—Lipp; 979—Lipp; 980—Lipp; 981—Lipp; 982—Lipp; 983—Lipp; 984—Lipp; 985—Lipp; 986—Lipp; 987—Lipp; 988—Lipp; 989—Lipp; 990—Lipp; 991—Lipp; 992—Lipp; 993—Lipp; 994—Lipp; 995—Lipp; 996—Lipp; 997—Lipp; 998—Lipp; 999—Lipp; 1000—Lipp; 1001—Lipp; 1002—Lipp; 1003—Lipp; 1004—Lipp; 1005—Lipp; 1006—Lipp; 1007—Lipp; 1008—Lipp; 1009—Lipp; 1010—Lipp; 1011—Lipp; 1012—Lipp; 1013—Lipp; 1014—Lipp; 1015—Lipp; 1016—Lipp; 1017—Lipp; 1018—Lipp; 1019—Lipp; 1020—Lipp; 1021—Lipp; 1022—Lipp; 1023—Lipp; 1024—Lipp; 1025—Lipp; 1026—Lipp; 1027—Lipp; 1028—Lipp; 1029—Lipp; 1030—Lipp; 1031—Lipp; 1032—Lipp; 1033—Lipp; 1034—Lipp; 1035—Lipp; 1036—Lipp; 1037—Lipp; 1038—Lipp; 1039—Lipp; 1040—Lipp; 1041—Lipp; 1042—Lipp; 1043—Lipp; 1044—Lipp; 1045—Lipp; 1046—Lipp; 1047—Lipp; 1048—Lipp; 1049—Lipp; 1050—Lipp; 1051—Lipp; 1052—Lipp; 1053—Lipp; 1054—Lipp; 1055—Lipp; 1056—Lipp; 1057—Lipp; 1058—Lipp; 1059—Lipp; 1060—Lipp; 1061—Lipp; 1062—Lipp; 1063—Lipp; 1064—Lipp; 1065—Lipp; 1066—Lipp; 1067—Lipp; 1068—Lipp; 1069—Lipp; 1070—Lipp; 1071—Lipp; 1072—Lipp; 1073—Lipp; 1074—Lipp; 1075—Lipp; 1076—Lipp; 1077—Lipp; 1078—Lipp; 1079—Lipp; 1080—Lipp; 1081—Lipp; 1082—Lipp; 1083—Lipp; 1084—Lipp; 1085—Lipp; 1086—Lipp; 1087—Lipp; 1088—Lipp; 1089—Lipp; 1090—Lipp; 1091—Lipp; 1092—Lipp; 1093—Lipp; 1094—Lipp; 1095—Lipp; 1096—Lipp; 1097—Lipp; 1098—Lipp; 1099—Lipp; 1100—Lipp; 1101—Lipp; 1102—Lipp; 1103—Lipp; 1104—Lipp; 1105—Lipp; 1106—Lipp; 1107—Lipp; 1108—Lipp; 1109—Lipp; 1110—Lipp; 1111—Lipp; 1112—Lipp; 1113—Lipp; 1114—Lipp; 1115—Lipp; 1116—Lipp; 1117—Lipp; 1118—Lipp; 1119—Lipp; 1120—Lipp; 1121—Lipp; 1122—Lipp; 1123—Lipp; 1124—Lipp; 1125—Lipp; 1126—Lipp; 1127—Lipp; 1128—Lipp; 1129—Lipp; 1130—Lipp; 1131—Lipp; 1132—Lipp; 1133—Lipp; 1134—Lipp; 1135—Lipp; 1136—Lipp; 1137—Lipp; 1138—Lipp; 1139—Lipp; 1140—Lipp; 1141—Lipp; 1142—Lipp; 1143—Lipp; 1144—Lipp; 1145—Lipp; 1146—Lipp; 1147—Lipp; 1148—Lipp; 1149—Lipp; 1150—Lipp; 1151—Lipp; 1152—Lipp; 1153—Lipp; 1154—Lipp; 1155—Lipp; 1156—Lipp; 1157—Lipp; 1158—Lipp; 1159—Lipp; 1160—Lipp; 1161—Lipp; 1162—Lipp; 1163—Lipp; 1164—Lipp; 1165—Lipp; 1166—Lipp; 1167—Lipp; 1168—Lipp; 1169—Lipp; 1170—Lipp; 1171—Lipp; 1172—Lipp; 1173—Lipp; 1174—Lipp; 1175—Lipp; 1176—Lipp; 1177—Lipp; 1178—Lipp; 1179—Lipp; 1180—Lipp; 1181—Lipp; 1182—Lipp; 1183—Lipp; 1184—Lipp; 1185—Lipp; 1186—Lipp; 1187—Lipp; 1188—Lipp; 1189—Lipp; 1190—Lipp; 1191—Lipp; 1192—Lipp; 1193—Lipp; 1194—Lipp; 1195—Lipp; 1196—Lipp; 1197—Lipp; 1198—Lipp; 1199—Lipp; 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WHO'S WHERE

In the Front Office

I. A. Aker will be appointed executive vice president of KLM Royal Dutch Airlines this fall and is scheduled to become president later this fall, filling a vacancy created by the death of KLM founder Albert Plesman (Aviation Week Jan. 31, p. 7).

Earl D. Johnson, president of Air Turbine Associates, has been elected president of Air Cargo Inc.

Clarence Greenleaf, chief executive of Independent Aeronautical Design Team and Clarence Greenleaf, Inc., a new subsidiary of Independent States Corp., New York.

William E. Skiles, former vice president of sales and traffic for Stutz, has joined Stutz Enterprises, Watrous, Neb. N. C., in an executive capacity.

Clarence Pike has been appointed vice president of Aero Manufacturing Corp.'s Custer Division, Custer.

William M. Jordan has become vice president for Stutz Products Engineering Co., Springfield, Ohio.

Lucas F. Bando has been elected vice president manufacturing and a director of Bando Co., Ridgeport, Conn. C. Harold Anderson is new chief executive.

William H. DeHaven has been appointed treasurer of Anthony Industries, Lubbock, Tex. Mervin, N. Y.

Richard G. Downing, chairman of NATV's operations staff, will join Algonquin Airlines April 5 as assistant to the president.

Changes

Ernest H. Altschul, former vice president for Pacific Aerospace Corp., has joined Gray Multiplex Corp., as general manager of the Aviation Division at Los Angeles.

Edward H. Powers, executive vice president manufacturing for Pacific Aerospace, has taken charge of E. W. Blum Co.'s new West Coast factory at San Jose, Calif.

R. H. Burch, a new general traffic and sales manager for Bristol International, Inc., was.

Philip A. Gelson has been appointed chief preliminary design engineer for Lockheed Aircraft Corp. in a reorganization of the company's engineering organization at Berkeley, Calif. W. R. M. Hawkins is chief engineer at Lockheed's new Mach 2.000 Division.

Edward E. Fiske, former general manager of Air American Aircraft Production Division, has joined Fairchild Engine & Airplane Corp. on special assignment with the manufacturing department of the Engine Division at Farmingdale, N. Y. Thomas J. Sullivan is in charge of Fairchild's new West Coast office in Hollywood, Calif.

George Hart has become chief engineer of Buellman Electric Products Corp., Hillside, N. J.

Levin H. Frank has been promoted to president of Republic Aviation Corp., Farmingdale, N. Y. Other changes: **R. A. Vernon**, chief of Engine and Power Division; **George A. Gable**, chief of experimental planning and control.

(Continued on page 10)

INDUSTRY OBSERVER

Chrysler is developing a turbine version of the F-102 delta wing interceptor for USAF. The TF-102 will have a side-by-side seating arrangement and will be powered initially by a PW5A-157. A switch to the Wright J65 is scheduled when that engine becomes available.

Pitt & White Aircraft has its J75 turbojet engine experiments on a test stand at the East Hartford, Conn., plant. The J75 is a single-compressor design aimed at producing about 15,000 lb thrust dry and 21,000 lb thrust with afterburner.

New turbojet has grounded the McDonnell F-101N Demon after three accidents in a two-week period since May 9. One Demon exploded on the air and the McDonnell test pilot bailed out safely. Another made a dash for landing after an engine failure. The third developed a fire in the tail section and crashed after the Navy pilot bailed out safely. None has a substantial jet in the primary causes of the accidents.

General Electric's J79 turbojet now is constructed for installation in the Convair XE-35 Electric experimental bomber. The J79, originally known as the J75, is a single-compressor design fitted with variable-pitch stator and has a relatively small frontal area.

Bell Aircraft Corp. expects to deliver about 100 commercial helicopters this year, according to a company spokesman. That is a 40% increase in commercial deliveries over 1955. Bell West Division now has a \$100 million backlog in military and commercial helicopters.

First Republic F-40F Thunderbolt powered by a General Electric J75-5 turbojet is scheduled for shipment to Edwards AFB, Apr. 21 for flight tests. J75 is being considered as a replacement for the Wright J65 now used in the F-40F.

Thompson Products has fabricated experimental jet engine compressor bearings and rotors from titanium and its alloys. All jet engine manufacturers are extremely interested in titanium applications to jet turbines.

Standard Aircraft Co. of Tinton, N. J., is converting a Chase C-123 twin engine transport with a boundary-layer control system under a USAF research contract. Flight tests are scheduled to begin near the end of 1956.

Corvair's two T71-60 jet engines at T1. Wright has been awarded by USAF for use in flying test beds for new jet engines. The T71 jets are converted, sweeping B-36s and have nacelles to house jet engines.

Boeing is now making tests on a B-57 Striketail carrying and launching a ball B-57. Based on the design initially. Presently, USAF also will equip B-56 and B-57 long range bombers with the capability to carry the Mark 15 missile for fast target penetration on a 100-m range.

Glenn L. Martin Co. is well along in a new version of the Canberra—the B-57A. New version will have a large bomb-bay that the B-57A has. Increased thrust capabilities and later will carry 20,000 lb of bombs instead of 5,000 lb of bombs now used on the B-57A.

Kaiser Metal Products, Inc., now has a backlog on aircraft wing trailing to the spring of 1955. In addition to wing and standard steel tailpipes for the B-57, KMP has built more than 575 aft fuselage sections and 906 tailpipes for the B-57.

Aero General Electric has been awarded a contract by the General Electric Corp. to build test beds at the USAF Langley Research Division, Hampton, Va.

USAF is considering proposals and contracts to recruit manufacturers of a handbook of instructions for guided missile designers.

radio-propelled missiles. These jets are described as a 762-mm. artillery rocket, while Lolo is described as a 70-mm. air-to-air rocket.

In a 12-page list of radio and radio equipment the following items are listed:

- Missile landing radio AFN/TPQ-5
- Entrance of this equipment still in of locally checked in military security systems. It was used successfully in Korea against Communist troops.
- Coastal guidance system for the Coastal and Nike missiles.
- Coastal control group for the Patriot, AN/APA-33.
- Tracking and guidance radar for the Terrier, AN/SPQ-3.
- Ground fire control system for Terrier, AN/SPQ-3.
- Airborne air-to-airborne radar, AN/APA-44.
- Airborne radar measurement set, AN/APT-4 and -16.
- Airborne radar, bombing and navigation radar, AN/APT-31 and -33.
- Airborne ground position indicator and combat information center, AN/APA-73.
- Radar measurement transmitting set, AN/ALT-3 and -5.

Taylor Appointed ANDB Director

Col. J. Francis Taylor, Jr., chief of mobilization for USAF's Directorate of Plans, last week was appointed director of the Air Navigation Development Board.

The second D. K. MacInnes under the present reorganization of the board, is directed to coordinate ANDB's functions. Defense and Commerce Departments have appointed a new chair (Aviation Week Jan. 18, p. 23) for the board, which will staff it with top-level civil and military representatives.

Members of the new staff will be named later.

• **Common System**—ANDB was founded in November 1948 by the Secretaries of Defense and Commerce to guide and coordinate research and development for a common military-civil system of air navigation and traffic control.

Taylor was a fighter pilot in World War II and has been associated with all weather and instrument flying since the war. He was deputy chief of USAF's Air Weather Flying Division from 1945 to 1948 at Clinton County AFB, Ohio.

• **Radio Airlift** Veterans—During that period, he was project officer for the all-weather airlift experiment carried out in 1947 and 1948 which operated between Wilmington and Washington.

Taylor is an 18-year veteran of USAF.

USAF Chief's Report

U. S. Passes Air Production Crisis

Twining says strategic power, too weak for all-out war during Korea, now is able to deal with that threat.

By William J. Connelley

Los Angeles—Gen. Nathan F. Twining, USAF Chief of Staff, and his staff the U. S. has passed the crisis in aircraft production—a crisis during which the nation was on short of planes and weapons that a strategic air war against Red China would have left the U. S. unable to meet the Russian threat.

Our strategic bomber force and weapon supply during the war in Korea was not so terribly small," Twining said, "that after an all-out war against Red China, we would have had nothing left."

• **Blame**—American-Diplomatic action that behind U. S. Air Force planes from crossing the Yalu River border have been made dramatic. But that was the

most heated and serious in public by a top Air Force official that U. S. military weakness in the air was one of the major reasons against striking north of the Yalu—a weakness which persisted until only a few months ago.

It made clear that U. S. first of becoming involved in a strategic air war with Red China was an important development factor in U. S. by Eastern policy throughout most of the war in Korea.

• **Perilous Danger**—"The hidden danger that confronted us in Korea was more serious than the immediate possibility of being driven all that far geographically," Twining told the Los Angeles World Mirror Council in a major address. "The most perilous danger was the possibility of having to not only build strategic bomber force against targets of secondary importance in Manchuria."

"In 1938 and 1939 we had previously not got bombs and few jet fighters, at least thousands of jet fighters and many jet bombers in the hands at the Red. We knew from the experience of World War II that years would have to pass before our industry could reach its maximum rate of aircraft production at the lowest air industry that was our predicament in 1938, 1939, and well into 1943."

• **Costly Victory**—"The Air Force Chief and the U. S. air industry, could have fought and won an air war against Red China."

"But the nation would have lost its planes and would have weakened our strategic power relative to the air strength of Soviet Russia itself."

Gen. Twining's admission that after such a war "we would have had nothing left," came in response to a question from the floor following his prepared speech.

The USAF Chief of Staff said the U. S. in recent months has been able to estimate their strength from the diagram position and now has an adequate supply of both weapons and aircraft to meet emergencies.

He warned that the nation must never again forget the length of time it takes to expand and reorganize an air force.

• **Growing Airpower**—The rising dependency of new equipment has made it possible to rely to a greater extent on American and Allied industries in any emergency, he said. The Air Force Chief praised the President and the Secretary of State for winning Russia

that "in the future we may not have the application of airpower in response to aggression as in the past."

• **In the Air**—Twining and Gen. Twining said the country may be less willing to let down large numbers of American ground troops in local actions against defense of Communist airpower.

"In the second place, we now have sufficient modern air equipment and sufficient new air weapons to say that equipment and these weapons is more than we do have to fight them. We could now do this and still be able to deal with the major threat against which we, in the past, have involved our last weapons and best equipment."

• **Clear Warning**—"This was implied as a clear warning to Moscow not to pass to the conclusion that the 'new look' in U. S. strategy means that the country is concentrating its strategic power to the neglect of the ability to fight in smaller local actions."

"We are not the cats in the place," he stressed. "The thinking and the training of people in the Air Force is now a more serious problem than in the past."

The lessening of urgency has made it possible to concentrate on finding of strategic goals and values in aircraft production, he indicated. "Sustained in aircraft production is of sufficient importance to be believed against the possibility of such delivery when the degree of urgency will pass," he said. "That fact has influenced our long-range plan extending the time period for attaining the 120 aircraft year we need and which has been approved."

• **Last Year**—In calendar year 1951 production for the United States Air Force and for delivery to Allied air forces reached a peak in numbers of aircraft. Because the bomber branch that always takes longer to produce are coming into mass production during 1952, the greater volume would be delivered during that year.

Aircraft production will continue at an even rate after mid-1951 into calendar 1952, the Chief of Staff said.

• **Swedish Plane**—During 1950 the initial equipment of the 137 wing Air Force will be gradually completed and Swedish production will start off as the rate needed to maintain that force and keep it modern," he stated.

But that level off must not and can't mean the end of the strategic importance of previous years, Gen. Twining warned the council.

The basis for that assurance is the simple fact that maintaining and keeping up to date a modern 137-wing Air Force is not a government's job and a continuous demand on our planes.

To maintain a 137-wing force of modern aircraft-airplanes for more complicated and expensive than the old

airplanes of 1930—will require an annual investment in new aircraft comparable to the entire Air Force budget of 1950," he added.

• **Support for Air Force**—Twining gave support for a strong civil air transport industry as a vital part of national defense and indicated a growing Air Force interest in an increased air transport, supplies and equipment. Voluntary forward stockpiling can be reduced by use of air equipment, the general said.

"In short, we are looking more and more upon the military aspect of the industry," Twining said. "As the range of our planes increases, we are

more aware of the military aspect of the industry and USAF, working together, might be able to produce an atomic-powered airplane in a few years."

• **Atomic Power**—In discussing another step the Air Force is taking which will have a bearing on the future workload of the industry, Twining said "As the range of our planes increases, we are

more aware of the military aspect of the industry and USAF, working together, might be able to produce an atomic-powered airplane in a few years."

"The atomic power airplane will revolutionize our warfare and our transport to a degree far exceeding the current revolution brought on by the jet engine," he predicted.

• **Atomic Power**—In discussing another step the Air Force is taking which will have a bearing on the future workload of the industry, Twining said "As the range of our planes increases, we are



NAA TEST PILOT JOSEPH A. LYNCH, JR., (left) with Prince Bernhard of the Netherlands by the two-place TF-8F Silver Star trainer in which they flew through the same burner several days before Lynch was killed when the plane crashed. Also noteworthy in this picture are modifications to the vertical fin and cowling view of the TF-8F, a larger dorsal fin and a lower-kilobits to the NAA known as.

TF-8F Crash Kills NAA's Lynch

Joseph A. Lynch, Jr., 33, one of North American's most able test pilots, was killed May 17 in the crash of NAA's TF-8F Silver Star trainer at Nello Air, Los Vegas, Nev.

A company spokesman said last week North American had received no word about Silver Star's crash.

Lynch was demonstrating the new trainer for Air Force officers when it went out of control during a low-altitude roll. The aircraft exploded after a wing hit the ground Lynch, throat killed, was killed instantly.

Less than week before, Lynch shared the controls of the same plane with Prince Bernhard of the Netherlands when the plane made its last supersonic flight.

An investigating team from North America, left for Nevada the day following the crash to provide the wreckage of the plane.

The crasher brought an end only to what was scheduled to have been a nationwide demonstration tour of USAF bases with the two-place Silver Star trainer.



LOCKHEED XV-1 fighter, shown during second test of large prop aircraft, undergoes horizontal test tests at Edwards AFB.

Navy Studies New VTO Fighter Tactics



CONVART VTO PILOT Gibson views cockpit of vertically mounted delta wing aircraft.

Naval Air technicians are preparing new operational magazines for their vertical takeoff interceptors (Naval Air Week Mar. 22, p. 14).

Original idea behind the development of the revolutionary aircraft was to provide an intercepter for protection of unarmored sea convoys. That task remains the primary reason for VTO plans.

Effective Defense—"We could not afford to send as many aircraft with every merchant convoy, but we still had the problem of providing an effective defense to our attack and enemy air patrols," a Navy officer says. "We needed a group of fighters capable that could operate from a platform on a merchant vessel. We had considered the vertical takeoff idea for about ten years."

It wasn't until 1953 that the Navy held a design competition and issued contracts to Lockheed and Convair for the design and construction of prototypes. Development cost is about \$30 million.

Newcomer—Additional reasons for the VTO include:

- Close ground support with VTOs equipped with bombs. Support would be more effective since VTOs could attack targets faster than fighters operating from fields farther back.
- Coastal air defense. With take-off time reduced to a maximum, VTOs give available minutes in taking interceptors.

• Observation of rapid movements of enemy ground units.

• Protection against enemy observation aircraft.

• Air rotation where conventional landing facilities are not available and fighter bomber aircraft are required. Navy points out that sea, in current complement hangs upon the outcome of light tests scheduled this summer and field operational testing. "It will take lengthy evaluation time before we can decide the where and the reasons for possible utilization of VTOs," Navy says.

Limited Role—But the Navy is certain of one point: VTOs will not make the aircraft carrier obsolete. Navy will only use them in very special cases when the VTOs were first announced that it would make carrier unnecessary because the new aircraft would not use or require carrier space.

"VTOs will not compete with our air-dependent aircraft," a Navy spokesman says. "They cannot do the job of our high-performance fighters or the attack bombers. For the foreseeable future they will definitely be needed for fighters for sea against special targets."

"In addition, VTOs will need more training and achieving points just as any other Navy aircraft. Their present and future development is relatively dependent on powerplants. It is difficult at this time to estimate of a VTO aircraft of the size of our A7Ds or with the performance of the F4D."

Two Approaches—Navy is using two approaches in testing and development of the new planes as well as in design. The Lockheed XPV-1 will be maintained and serviced while the aircraft is in a horizontal position, while the Convair XPV-1 will be maintained vertically.

Tests of the Lockheed strapping model will be held at Edwards AFB. It is equipped with landing gear for tests in the horizontal position.

The delta wing Convair will undergo "negative" flight tests in a steep barge at Moffett Field, near San Francisco. The XPV-1 will be refueled while the engines are run up, but will be supported by cables from the barge and not by short flights and landings.

Transition—Characteristics—Convair pilot J. F. (Skip) Calhoun says one of the last things he will do following the longer tests will be to explore at a safe altitude the transition characteristics from horizontal to vertical flight. He believes this will be the most critical flight phase for the VTO.

Navy will not decide whether Auto will use an empennage for takeoff, landing and short flights. "It's always a possibility."

Five Jettable—Convair designers claim the aircraft will be able to hover in a vertical position, moving in any direction like a helicopter.



IN TAKE-OFF POSITION, Lockheed fighter is checked by mechanics, who provide radio.



LOCKHEED VTO IN HORIZONTAL position, shows its dual prop tapered wings.

Designers also say the VTO will be completely controllable in all attitudes. Controls are conventional close to the cockpit, and the bottom can be positioned for emergency horizontal landing.

Calhoun expects visibility to be good when taking the plane down for a landing. He compares the operation to

backing an auto into a garage. The pilot's seat can slide 45 deg forward for the takeoff and can be controlled by the pilot.

Dimensions of the Convair model length 30 ft 9 in., wingspan 27 ft 2 in., height, 10 ft 6 in. below, 22 ft 7 in. Lockheed dimensions are approximately the same.

Navy Eases Security Regulations

By Robert Hottel

Navy Bureau of Aeronautics last week began distributing a revised version of its directive on military security classification and public release of information on Navy aviation equipment.

The new document is BuAer Instruction No. 05510-10A dated Mar. 2, 1954, and replaces BuAer Instruction No. 15510-14 dated Dec. 7, 1953.

The directive was written at the specific request of Assistant Defense Secretary Fred A. Seaton after widespread criticism of the previous directive by aircraft contractors was called to his attention by AVIATION WEEK (Mar. 18, p. 15 and Mar. 22, p. 17). BuAer spokesmen admitted the critics of this directive was the direct result of Aviation Week protests made to Seaton.

Four Points Changed—The new directive, signed by Rear Adm. Agatha Scott, chief of BuAer, changes the language of the first four controversial points of the earlier version that were widely interpreted as an attempt to clamp policy on political controversy on the release of Navy aviation information in the guise of military security. These points are:

• **Classification of unclassified material**—The sentence under Paragraph 3, reading "The declassification of information does not constitute authority for its public release," has been deleted.

• **Flight clearance of news media representatives**—The earlier directive specified that before a news media representative could make an actual visit to a military installation, an executive faculty for any purpose, clearance from the Bureau of Aeronautics and Defense Department Office of Public Information must be received. The new directive specifies that visits only for the purpose of obtaining information about aircraft design, development or new equipment are confidential based on BuAer and Defense decisions.

"The new directive makes no change in the clause specifying that 'news' or 'non-military' nature of such interest requires that Defense Department sponsored press briefs and demonstrations may become security."

• **Exclusive status**—This section of the new directive makes it clear that only original military information will be furnished by the Defense Department as to just release when they are deemed of military importance. The earlier directive indicated that redacted "important" items, filed for security clearance as a result of a pilot visit, might be appropriated by the Defense Department for a national release.

The directive does not contain any-

thing that would explain the Navy's recent conduct in providing its publication with exclusive information and pictures in the two vertical takeoff fighter prototypes built by Lockheed and Convair far in advance of the time this new information was made available to other publications (AVIATION WEEK Mar. 22, p. 14). Nor does it explain how this particular publication was given material to make a story covering several pages, while the Navy attempted to limit the rest of the press to a four paragraph official release.

One point in this section still pending working press clearance is the statement that only unclassified material will be given in news media reports on this type of visit but all stories obtained on visits must be submitted to the Defense Department for security clearance. The observer point out that if only unclassified material is dispersed, there is no need for further security clearance.

• **Liberalization of security categories**—The three titles included in the directive indicating various security categories on all equipment, aircraft and related material and report drawings have been classified slightly in contrast to the earlier directive.

"Typical of the changes are the manner that the specific performance of an aircraft should be classified only on critical portions of its tactical mission. Thus while the service rating of a new fighter should be classified because of its importance to the aircraft's performance of its tactical mission, the rating of an air-to-air maneuver plane was of no military importance because

its military mission would be performed at low altitudes.

• **Basing More Liberalized**—Another portion of these liberalized instructions say:

"It must also be realized that when external photographs of an aircraft have been released and press weight, fuel load and engine thrust ratings are known, an experienced analyst can make accurate performance calculations, particularly on aircraft of experimental design. Accordingly release of performance information may be more liberal."

The new directive also alters the instructions regarding the upward classification of material in a contractor's books as a result of the recent abolition of the security category "Restricted." General military practice has been to upgrade this to "Confidential."

The order directive required all contractors to make this switch in their own papers pertaining to Navy contracts. One contractor estimated it would cost him \$100,000 to do the paper work, and guarantee the cross-indexing of his records necessary to comply with this requirement.

• **Simplifies Procedures**—The new directive specifies that contractors must change the security classification on all external data when it is received from BuAer for use or reference. Thus all of the material being classified in viewmaster files need not be switched to cross-indexed files or re-indexed with a higher security classification. This is expected to simplify the contractor's problem in the future but will be of little help to contractors who already have attempted to comply with the letter of the earlier directive.

The new directive will be distributed to all Bureau of Aeronautics' contractors and Bureau of Aeronautics' field organizations at contractor's plants.

• **Classified-but Not**—Although the earlier directive is classified "Confidential," it was this classification is valid only because of the attached list of all Navy experimental equipment under contract with its current security classification. The directive itself may be handled as "Confidential" unless these lists are leaked.

The Bureau of Aeronautics made a copy of the new directive available to AVIATION WEEK shortly after it was approved by Adm. Scott for publication and distribution to the field.

The original BuAer directive was published and mailed to the field with-out press subdivisions to or clearance by the Defense Department Office of Public Information, headed by Seaton. On making the original AVIATION WEEK story as the BuAer security directive, Seaton and his aides said the Navy language was "loose" and were basing the intended meaning of Defense Department security policy.

Convair's globe-nearing B-36 is also an airport in the sky

Something new has been added to the B-36 bomber, already the most effective and versatile aerial weapon in history.

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As Convair's airfield and growth is base for weapon systems planning. Which for new paradigms of power through engineering that arms at the assistance of its people.

Engaging in the 10th power

CONVAIR

See 10th power, page 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.



The fighter joined in its high performance, photo-reconnaissance version of the Republic. Development, related to prove the significant development with Convair's B-36.

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X-1A Hits Mach 2.5



The Mach 2.5 flight of the Bell X-1A is sixth place but Dec. 12 is shown as the plane's superior in this page. USAF Maj. Charles F. Yeager, since a blown into the nose the X-1A, scored beneath the belly of its Boeing B-29 mother plane, a towed in the supersonic tests for being (top left) to his landing at Edwards AFB, Calif. (bottom left) The supersonic Superfort is seen doing its steady one-hour coast to 10,000 ft. prior to dropping the X-1A (top right) Downside release of the second plane for its 1,000-psi flight is shown, above center.

Boeing Predicts AF Will Buy 707

By William J. Goughlin

Seattle—President William M. Allen of Boeing Aerospace Co. is confident his multi-million gamble on a jet transport prototype is about to pay off—into a military contract.

Boeing also believes its new Model 707 jet liner will put the U. S. years ahead of the French in the commercial jet transport field.

But do not be confused by the many references to the Boeing prototype as the first U. S. jet liner. The big plane under development behind a 38-foot-high wall in the company's plant at Renton, Wash., is a military prototype, not a commercial airliner.

► **Race Back**—There are no passenger seats in its 40-seat version, no flush air lock fittings to cover the door hole. There will be none when the ship rolls out of the hangar on June 14.

The prototype is a military tanker transport, a jet version to the KC-97 tanker serving out the secondary line at Renton at a snail's pace.

Boeing has no order yet for its privately financed aircraft, either military or commercial. Air purchases are at least three years off. But the reason the decision was made to go ahead with the prototype can be found on the nearby line at Boeing's main Seattle plant, 10 miles from Renton. There, the first production B-52A Superfortress is ready for release.

► **Highspeed Tanker**—It is a good bet that of these two no B-52, that would be no Model 707.

To achieve full tactical flexibility, the fast-burning, maneuverable B-52 is a quiet aircraft, reflecting its load. Their eight powerful Pratt & Whitney Aircraft J57 engines. The secret is in the four smaller jet engines, the J-47s.

President Allen said he and his staff that military necessity will demand a jet tanker to accompany the jet bomber.

To look the highspeed B-52s and B-47s to take popper-driven tankers would reduce their performance and reduce their global striking power.

► **Military Need**—Of the jet prototype, Allen says: "We feel it is a plane that is needed by the military for the B-52, and also the B-47."

In developing that need, Boeing has been assured of a military contract. Obviously, it is a major fact the Air Force to order an off-the-shelf aircraft that already has flown, thus to finance the development of an untried design.

"I don't want to create the impression that if we don't get a military order, it would kill the commercial project," says Allen. "But a military

order will cure the problem. We are very much interested in both fields. We do feel we should first explore the military field."

► **707 Price Tag**—A price has not been set on the Model 707 commercial version. According to company sources, it probably will be closer to \$4 million than the \$3-million estimate published elsewhere.

A price has been quoted to the military but Boeing declines to reveal the amount. Commercial price tag will be paid, of course, on the quantity ordered as well as the unit of the such as provided by its military order.

► **First Studies**—Boeing began its first jet transport design studies in 1946. With the appearance of the P-60A, 177, noted for 100,000 ft of thrust, Boeing engineers divided two years ago to meet the new, speed and range requirements of their projected jet liner.

Second studies covered the design of the jet engine, the jet engine to be used on April 23, 1952. One was growing military emphasis on night refueling, supported by large KC-97 orders. Another was the change in strategic bombing concepts brought about by nuclear weapons. One variant now could pack a punch in lethal as that of thousands of aircraft in the

mass bomber raids of World War II. So far, studies studies by single aircraft or small groups would require a tanker that could loop back and alternate with them on "body" missions. In other words, a jet tanker.

The Defense Department also expressed interest in faster troop and cargo transports.

► **Anticipated Opportunity**—For these reasons, Boeing management felt there was an opportunity not only to anticipate a military need but also to use its background of multi-jet experience in a bid to compete for the commercial market.

Certain they could build a prototype that would serve both as a military and commercial demonstrator, Allen said he still convinced Boeing's board of directors that an aircraft requiring an expenditure of \$15 million even before its first flight was a good value.

► **\$15-Million Gamble**—The prototype has been publicized as a \$15-million gamble with Boeing money. But the actual risk to the company was much smaller than that, thanks to the reducing tax situation. On a basis of \$15 million, it would be more in the neighborhood of \$3 million.

If changing construction costs to actual expenditures, Boeing was allowed to use funds that otherwise would have been subject to the extreme profit tax.

Because Boeing profits already were

Reverse Thrust for Boeing Jets

Seattle—Boeing Aerospace Co. has developed a reverse thrust system for jet engines that appears to accelerate the company's pioneering jet transport production version of its Model 707 jet transport.

News of the long-sought reverse thrust development, which holds great significance both for commercial and military aviation, is being withheld by the company but may be announced later this year.

One company official says the device, "very successful."

Reversing, due to its concentration in the field of heavy multi-jet aircraft, has been actively engaged for some time to a project to provide these aircraft with the safety and tactical advantages of reverse thrust.

► **707 Decision**—When questioned by Aviation Week, top company officials confirmed that production version of Boeing's jet transport will be equipped with the device. "The prototype will not be equipped with reverse thrust as its early flights, they reported.

Success of the system presumably would mean B-52s and B-47s also

would be so equipped. Military security could halt release of technical details of the Boeing development.

Also taking out patents, Boeing might license manufacture of the device to another company, much as it did with its anti-ice braking system. Advantages of the system that would be made available for all U. S. military and commercial jets.

► **Major Problem Solved**—Boeing engineers believe they have overcome a major deficiency of other reverse thrust developments mentioned from her. The device not jet engines at as much as 10% of their normal efficiency in forward flight.

The Boeing development permits close to 100% efficiency during forward jet operation with the usual service penalty being the additional weight one source reports.

Another feature of the system, the Boeing sources reveal, is its fuel efficiency, based upon aerodynamic principles. It cannot operate above a certain altitude. This would eliminate the danger of thrust being inadvertently reversed in flight.

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JAF FUEL TANK COVERS inside the Kawasaki plant near Kobe await delivery.

Japan Air Industry Gains Muscle

Factories negotiate for new U. S. airframe and engine production agreements, now holds four licenses.

By A. W. Jessup
(McGraw-Hill World News)

Tokyo—Japan's aircraft industry is negotiating with U. S. firms and agencies under new contracts designed to get Japanese factories, beginning to roll with four licenses already signed, back in production. Largest contract signed so far is Japan's bid for refueling tanks after a seven-year shutdown in a bitter Lockheed Aircraft Service Overseas and Kawasaki Aircraft Co. for design and manufacturing rights to the F-94C and T-33A (AERONAUTICS WEEK May 8, p. 7).

Earlier agreements covered Kawasaki's production rights to Bell Aircraft Corp.'s H-47D helicopters, Fuji Heavy Industries Co. with Bell Aircraft Corp. for the T-28, and Topo Aircraft Co. for the P-400, and Fuji Heavy Industries Co. for the P-400.

► **New Contracts**—The four agreements are the first of a series of similar contracts now under negotiation. ► **Mitsubishi Heavy Industries**, Nagasaki, Ltd. (Shen Nipponbun), with North American Aviation, covering various models of the F-86 and T-33E, and with Pratt & Whitney Aircraft for the maintenance of jet engines. ► **Idemitsu Heavy Industries Co.**, with General Electric Co. for jet engine production.

► **Saito Motor Industry Co.**, with Republic Airlines Corp. for rights to the F-4A.

So far, no deal as yet in the making for production of conventional air transports. The industry's hopes are still tempered with reservations of the cost of building engines plus the chances of selling them on the competitive market.

► **Postwar Production**—Japanese postwar aircraft production can be totaled on a fuzzy count, compared with an output of slightly less than 70,000 from 1943 to 1945.

Parts manufactured in Part T-34 last month, Topo has put together fewer than 20 Fletcher TD-23As, and Kawasaki completed its first H-47D in January but has no others nearly ready to roll off the assembly line.

In addition, Mitsubishi has assembled a few Sikorsky S-55 engines for Maritime Safety Board, Japan's postwar navy arm.

► **Technical Assistance**—Lockheed will furnish Kawasaki whatever technical assistance is required in the manufacture of the F-94C and T-33A as well as in the overhaul and maintenance of these aircraft for parts of the Post Air Force, now and for the Japanese air force later. Lockheed also is negotiating with the Allison Division of General Motors Corp. to provide Kawasaki with licenses to overhaul and manufacture Allison jet engines.

Kawasaki will pay a lump sum for the design and production rights to the all-weather fighter and trainer plus a flat fee for the jet engine maintenance under the agreement. In addition, it will send over Lockheed for the American technical staff that assists Kawasaki in Japan and for technical services furnished from Lockheed's own Japanese sources.

The down payment is less than \$3 million for both aircraft, according to reports. Since both are approved designs with the "minimum" aircraft model at the price tag is not excessive. Payment is conditional upon Kawasaki receiving orders.

► **T-33 Orders**—Curtis-Wright has

newly signed Mutual Defense Security Agreement between Japan and the United States, a Japanese jet plane at most is sure to be developed and these five orders for the T-33 jet trainer are renewed. The same contract is valid for the F-94C Starfighter. The Fiat Av. Fiesro has told Lockheed officials the T-33 is out of the picture here.

Apparently, Washington has decided to equip FEAF units with the T-33D in use in the mid-1950s, now being made, as completed. FEAF does not want its bulk of training Japanese complicated by two sets of aircraft with double legends and maintenance problems. So it is recommending that Japan adopt the T-33D for its all-weather fighters.

Some Japanese question the decision on the grounds that perhaps this country's plans are not yet sure likely to become, sufficient enough to raise a one-time, electronic-based airplane. Another argument in favor of the F-94C for Japan is the availability of a complete set of production line tools that could be loaned by USAF as direct transfer under MSA processes, cutting the cost of tooling to nothing.

► **Production Costs**—Japan wants its first block of T-33s late this year. Lockheed and Kawasaki have no intention of manufacturing them in Japan. But they believe all requirements after the initial delivery could be met by production here.

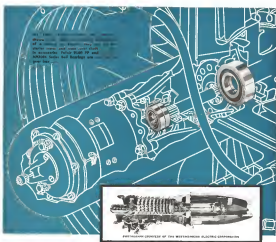
O'Neill said would not be much less than for aircraft purchased from Lockheed in the United States. An advantage to Japan would be the fact that a major portion of the price would be in yen rather than dollars, enabling this country to get some of its MSA funds for other military needs.

Lockheed officials believe there would be considerable saving in labor costs by manufacturing in Japan. "They point out that bond payments are large on aircraft. Low wages here, possibly, that American management techniques are used could cut the labor content."

► **Dollar Payments**—Below the agreement goes into effect, it will be necessary for the Japanese government to approve the dollar payments from Kawasaki to Lockheed and for Lockheed to secure U. S. permanent approval for export of the design details. Neither seems unreasonable.

One difficulty, however, may be getting early delivery to the Japanese as the dollar payments and for the placement of orders. Even here a not well understood law. The industry laws delay will reduce program manufacturing.

With a go ahead signal now, Kawasaki could deliver its first T-33s early in 1955. Engines from electronic design and controls of course would be imported from the U. S. for a con-



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admirable ground, and some items might never be produced in Japan.

► **Mitsubishi Agreement**—Mitsubishi is undertaking the overhaul of North American F-80s for FEAF. Negotiations nearly are complete for technical assistance in this overhaul, and the agreement may be signed within a month by Mitsubishi representatives in the U.S. Company officials say the overhaul is not necessary on the overhaul, but they consider it a necessary preliminary to acquiring the manufacturing rights.

Mitsubishi's program is less ambitious than Kawasaki's. The company hopes to begin assembling F-86s in about a

year from parts that have been shipped from the U.S. About one year later, manufacture of the airplane might be possible.

To some extent, the slow approach may be dictated by questions regarding adequate defense aircraft for Japan in the future. Mitsubishi may want to be free to produce its own fighter design before many years. After working on the F-86, engineers might come up with a light-weight version with higher maneuvering. While it's the best available fighter today, the F-86's below 50,000 ft. ceiling is inadequate to challenge newer, higher altitude fighters that might threaten Japan.

► **Fuji Destructive-Test** Heavy Indentation—Nakagawa Aircraft Co., Japan's World War II leader—has shown an interest in trying up with her own manufacturing.

The company told Associated Press their engineers had not decided what direction Fuji should take but that the decision probably would be to develop guided missiles. Such a decision would make sense. The Japanese market for missiles is limited, and not every manufacturer can make a go of it today.

Fuji's Beech T-34 license has seen up an important check at the tender market, giving it an incentive to operate as. With major government help, the company could develop now to provide Japan's future guided missile requirements.

► **Japan Defense**—FEAF's recommendations regarding models for Japan's air force are based on its conception of how Japan will take over its own air defense.

As a Japanese squadron is formed, trained and made ready it will integrate into an American wing of some sort based in Japan. Eventually, a second Japanese squadron will join the first and, finally, a third will replace the last U.S. unit. The Japanese air force then will build full independence.

An estimate as to when FEAF could withdraw is 1957 or 1958. Even then, Japan's defense probably will rest in part upon the U.S. Strategic Air Command and its long-range retaliatory punch.

By then, Japan hopes to build all or most of its combat aircraft. But there is a long way to go, dependent on a large extent upon the American loan—how that Japan is willing to accept.

AF Adopts Canadian Paratroop Computer

Ottawa—U.S. Air Force has adopted a Canadian-developed method of calculating in flight the exact moment to drop paratroopers and supplies so they will hit their targets. Royal Canadian Air Force reports.

The new system, developed by two RCAF officers, eliminates paratrooper errors that formerly had caused many as around the drop area and jeopardized the surprise element of a paratroop attack.

The computer enables navigators to determine exactly when to signal for paratroopers to leave the aircraft, is simple to operate and can be used for one parachute load or any set of one, several, or several hundred.

The system has been used by RCAF for years and is known as the Baco method for dropping paratroopers and para-troop supplies.

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BELL'S BIG HSL-1 hovers close to ground, displaying tandem rotor configuration. Craft's rotors, tail fin are not scaled.

Bell Begins Volume Production of HSL-1



HELICOPTER DIVISION of Fort Worth, Tex., is headed by Bellport.

New in volume production at Bell Aircraft Corp.'s Helicopter Division, Fort Worth, the Navy's tandem rotor HSL-1 first flew on Mar. 4, 1953.

Designed for both detection and destruction roles with anti-submarine war fare units, the copier has two-bladed rotor which fold to facilitate handling of the craft in elevation of aircraft carriers.

Fore and aft rotors are interconnected and power is furnished by a single Pratt & Whitney R1580-50 engine located in the aft fuselage.

The accompanying pictures show some assembly highlights along Bell's busy production line.



FUSELAGE: Basic assembly before air-top down final line after three main sections—rotor, fuselage and aft—have been upfitted.



PAWA R2000-50 is installed in HSL-1. The engine can be swung out on hinged mount for easy maintenance.



ROTOR UNITS get adjustments. Most assemblies in different stages of buildup are seen on either side of blade hub (center).



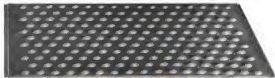
FINAL ASSEMBLY BAY shows some of the many copiers nearing completion on the line. Tandem rotor have not yet been installed.



VARIOUS BUILDUP STAGES are shown in these HSL-1s on camp. Stabilizing bar stretch from rotor mast on two of fuselages.

6

AN IMPORTANT NEW GEOMETRY FOR



HEAT EXCHANGERS

As the performance rating of modern aircraft continues to rise, extremes of temperature and pressure in heat exchange equipment create new and challenging problems.

Today's emphasis on heat transfer systems gives particular significance to Janitrol's most recent advance in this field: a new type of "simple plate" construction which improves efficiency, saves weight, increases strength, simplifies manufacturing, and opens a whole new geometry of design.

A complete heat exchanger can now, in effect, be laminated from identical, gas-tight stampings like that shown above. The sheets are welded in pairs, face to face, creating continuous passages for flow of air or liquid—each passage being at right angles to the next, and all passages manifolded in a simple economical design. The advancements increase rigidity of the assembly, facilitate fabrication, and at the same time accelerate heat transfer by creating a desirable turbulence in the flow.



Observe that this new lamination technique permits complex configurations practically without limit. Now, a high efficiency heat exchange system can be squeezed into spaces previously unusable, and duct or piping connections greatly simplified.

If your heat exchanger problems involve increasingly high temperatures, high pressures, or special space restrictions, you'll do well to investigate this new Janitrol development. In fact, whatever your aircraft combustion problems, your Janitrol representative can place at your disposal Janitrol's thirty-seven years' experience in the manufacture of combustion equipment.

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37 years experience in combustion engineering

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GAS TURBINE lab will be Thompson-operated, Navy-owned. Building starts in summer.

Jet Lab to Aid Thompson Research

Cleveland—General will be broken this summer for the Fairport, Ohio, gas turbine laboratory to be operated by Thompson Products, Inc. The facility, a Navy installation, is expected to begin operation sometime next year, and will give Thompson increased capabilities to evaluate materials, components and accessories for jet engines (Aerospace Week, Aug. 31, 1958, p. 7).

The facility is being designed by Swearing & Parcel, consulting engineers, Bait, Barstall and Newman, Inc. is designing the steering equipment for the test cells. The physical layout (see sketch at top of page) will include:

- Two-cell test house, each cell capable of accommodating full-scale current jet engines, and these in the future de-motivated pattern. A gas jet will be substituted to aid in starting of turbochargers and thermal loads on hot turbine wheels.
- Office building, to accommodate about 20 engineers and technicians, who will supervise test setups and minor test data.
- Storage facilities for various types of fuels now being used, and for experimental fuels associated with studies in the new lab.

Engine and test cells in the new lab auxiliary probably will be obtained as direct contract with the military. Operation for proving state of test items will closely approximate service conditions.

- Jobs Planned—Planning for work in the laboratory includes the following items:
- New alloys for turbine buckets. These will constitute one of the first items for investigation when the laboratory is ready for operation.
- Corrosion—components of metals will research—also are going to get a close look, because at this stage of development their upper wear resistance, high-temperature applications and, in

addition, can go far to reduce dependence on critical materials.

- Coatings for alloyed metals will be studied. Protection of these coatings is seen as not too far away. Thompson hopes it will be the first to come up with vital answers. Alloyed metals have good heat strength and other attractive characteristics but oxidize very rapidly at operating temperatures of today's jets.

- Titanium alloys will be investigated for compressive applications.
- Blades made by different techniques—cast, forged, sheetmetal and powder metal parts—will be checked.
- Bearings that the present size, give satisfactory performance under operating conditions. Included will be engine-driven pumps and those used for lubrication service.

In addition to allowing Thompson to actually test results for better materials and parts, the new laboratory will do away with the necessity of using customer facilities, thus eliminating delays in scheduling of research, and will give the customer close control of test conditions.—EJ

Copter Symposium Covers Wide Field

A busy roundup on a wide range of helicopter topics now getting the attention of experts and observers is the international field studies on the second of a symposium on "Helicopter Operation and Design Requirements."

Probably the most comprehensive coverage of copter design and operation angles, this published record is a condensed version of the details brought out at the Sixth Annual Technical Conference of the International Air Transport Assn. at Puerto Rico, in April 1958. The report comprises 155 pages filled with highly informative transcript data plus a paper on Bellini's copter operation and analysis on cockpit lay-

out submitted by UK Ministry of Supply, making a total of 153 pages. Though the meeting was held about one year ago, the data contained goes well in its reach up to date as if the symposium had been held just recently. It illustrates an excellent insight to have consideration in the present and immediate future copter roles.

Topics include the transport roles of the helicopter, rotor characteristics, operations, design characteristics, cockpit requirements, passenger handling, ice, rotors, transmission, and general considerations. Each of these broad headings is treated on a detailed technical basis.

Representatives at the symposium included members from eight nations: Great Britain, France, Belgium, Canada, the United States, the Netherlands, and the Soviet Union.

Copies of the symposium record are available on order from IATA (Tech) Secretariat, International Aviation Building, Montreal 1, P. Q., Canada, for \$2.00 (U.S.). In the striking air, copies may be obtained through IATA Technical Liaison Office, 6 Grosvenor Place, London, W. 1, England.

Hot Extrusion Seen Economical for Steel

Work on the hot extrusion of steel at Harvey Aluminum, Tarrant, Calif., shows that the process can give satisfactory results in aircraft parts.

Harvey has made an extruded 6430 steel tubular attachment bracket for Lockheed and also has produced extruded shapes for Northrup, including a 4500 steel flap track component for the F-99 Scorpions.

Part Details—The extrudates made for Lockheed were cut into 5-in. lengths, drilled and installed on the Super Corsair without further machining, it is reported. Cost of the finished parts was \$3.90 each, against a \$29.40 cost for the same parts made by machining.

In the flap track component for the F-99, extruded 15-ft. lengths were cut into 2-ft. pieces. Compared with machined bar stock, considerable savings were realized in material—extrusions were 3.15 sq in. compared to 5.70 sq in. for the rod bar section, weight of the extruded piece is 3.84 lb. (4.42 lb./ft.) compared to a bar weight of 23.6 lb. (11.8 lb./ft.).

Costs, Properties—It is entirely conceivable, according to Harvey, that the extrusion process could yield to order 50 ft. of a special steel alloy shape by the hot extrusion process with a die cost of between \$100 and \$1000. Such an order, it is said, would not be commercially practical for fabrication by rolling.

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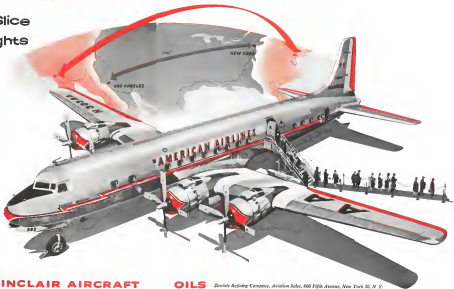
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DC-7 Flagships Slice 3 Hours from flights to Los Angeles

With the introduction of its new DC-7 Flagships, American Airlines has added another page to the record book of U.S. aviation. Powerful new 3200 hp "Turbo Compound" engines speed these specially designed transcontinental planes through the skies at a record 365 miles an hour. As a result, today, DC-7 Flagships are flying non-stop coast-to-coast in under 5 hours!

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Weapon System Plan Outlined to IRE

ARDC's Gen. Wood says basic research-development will not be jeopardized under Regulation 70-9.

Avionics industry representatives heard statements last week that basic technology research and development would not be jeopardized by the USAF's Weapons System Management plan. They were told too that the Air Force intends to avoid building up weapons over new electronic capacity, at public expense, to compete unfairly with other established industry.

The assurance came from Brig. Gen. Philip B. Wood, Deputy Commander for Technical Operations for the Air Research and Development Command. Wood described the equation and philosophies behind the Weapon System Management plan at the annual New York convention of the Institute of Radio Engineers, speaking at a length of time sponsored by the professional group of mechanical and mechanical electronics (PGANE).

■ **Regulation 70-9**—Gen. Wood quoted directly from AF Regulation 70-9 which sets up ground rules for the weapons system plan (Aviation Week Dec. 7, 1953, p. 12).

"Scientific control will be established and maintained by the Air Force to insure that:

• "Weapons and hardware equipment industry will be maintained."

• "Proper industrial base in the equipment industry is maintained to provide for rapid production expansion in the event of mobilization."

• "Achieve maximum profits and costs are allowed."

• "Government accepted standards are used to the maximum practicable extent."

Wood added that it is "one of the basic tenets of Air Force policy to encourage healthy competition in its design, and to avoid building up, at public expense, a capacity on the part of weapons system contractors to overprice unfairly with other established in design."

■ **Most Important Factor**—Pointing out that approximately 75% of AF's R&D budget is going into independent work and point and third-of-the-way research and development, Gen. Wood said that "about the most important factor as to whether or not we will... have a new weapons system at a given future date is the level of our scientific and engineering knowledge at the time development is started."

"The fact is recognized by the Air Force, and it is Air Force policy to maintain a development program, independent of weapons system development, to insure orderly, balanced, and continuing progress in studies, research, and development leading toward basic engineering knowledge, better design criteria, and improved components."

■ **Industry's Obligation**—The latter, however placed on industry in providing material to meet U.S. military requirements makes it necessary for industry to make "the most realistic technical approach that it can scientifically make," Wood pointed out. "Development and improvement both are equally bad, and may have done worse for the Air Force and the national economy. We must build what we know how to build. (But) must not wait so long to build that our new weapons are obsolete before reaching combat."

"The battle we [the Air Force, science, and industry] fight is one of timing and time-planning. Obviously, it does neither the Air Force nor our national security any good to have a superior arm available well off the line, unless all of the airplane's related ground equipment and logistic support are available at the same time," Gen. Wood emphasized.

The design of new weapons must take full advantage of advances in sci-

ence and technology to the weapons are not approaching obsolescence when they are delivered to combat units, he said.

"Nowadays, the development of a major air weapon system has become a great expenditure of the nation's time, effort, and dollars. (That) has resulted in extremely heavy engineering, management, and production capabilities for the Air Force," Gen. Wood said.

Systematic planning must precede the launching of a weapons system development, the general pointed out, emphasizing that the term "weapon system" includes ground handling, training and maintenance equipment, logistic support, in addition to the airplane together with all of its internal equipment.

■ **Development Planning**—At USAF headquarters in the Pentagon, "a small but extremely competent group of engineers and officers, the Office of Development Planning of the Air Staff, a group free of the day-to-day operations... pass into the future."

Wood said. "Using scientific methods, these counterparts of the ancient seers have almost frightening responsibilities. They study and consider a number of critical factors... (such as) our national policy as to the use of military power in advance before the rest of the world, military strategy and tactics, our plans, intelligence about the military and technical capabilities of the potential enemy, our current inventory of weapons and last but not least, we must have the state of science and technology."

The Office of Development Planning works closely with the ARDC and consults with scientific and industrial groups to prepare a Development Planning Directive which describes the capabilities of the air weapons required to support the basic combat mission of the Air Force for 15 years in the future. This is necessary if we are to insure technical superiority over the enemy, Wood said.

■ **Tighten Long Term Development**—After the DPO is approved by the Air Staff, it is used by ARDC to set up development programs for long lead-time items, such as major engine and structural components. The next step is to meet a General Operational Requirement, published by the Air Staff's Bureau of Requirements, which describes the operational need for a



Brig. Gen. Philip B. Wood, Deputy Commander for Technical Operations, ARDC.

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weapons to meet a specific mission, but does not specify the amount of satisfying the assignment.

ARDC reviews the COB and then contracts with industry for one or more General Design Studies of a weapon system, exploring advanced technical approaches in the problem to find the best possible solution.

ARDC reviews the results of these studies, then projects a step-by-step development schedule for the stated system and its major components that is approved by the Air Staff. ARDC is then ready to launch the weapons system development.

► **Managerial Assistance**—"The scheduling and time phasing of all elements of components that comprise a modern weapons system into an integrated development and production program require an almost unparalleled amount of managerial skill and know-how," Wood pointed out. "This has made it necessary that the Air Force seek managerial help from outside its own organizations." That is the objective of the Weapons System Management program.

Wood described the normal operating procedures of WSM under Regulation 70.9 in italics: "The weapon system contractor is responsible for the complete engineering integration of all

the components of the system. He prepares the model specification of the system as a whole, after analyzing and evaluating the general operational problems the weapon system is intended to satisfy.

"The talk to people who are to use the weapon, as well as to those who provide the operational requirement to which the weapon is to be designed, in order to get a better understanding of the manner in which the weapon will be used, the kind of base from which it will be operated, and the kind of operational environment in which it will be used.

"It is important for him to know, for example, whether a fighter bomber should be designed to operate off of land bases, whether it should carry nuclear bombs, bombing techniques to be used, whether complex tanks should be provided, the type of tactical control and warning network in which the aircraft will be operated, etc."

► **Model Specification**—"The contractor develops in the model specification a list of the equipment required by the system. Whenever possible, equipment already developed, or under development, are specified, and these will be provided by the government as CFAR—government furnished aircraft hardware equipment, Wood pointed out.

For the other items on the list, new developments must be contracted by ► **Weapons System Contractor**, which forms contracts with the categories of equipment outlined by equipment and when such development is within his capabilities.

► **Associate Contractor**, to fulfill performance type specifications laid down by the weapon system contractor in the model specification. An associate contractor is a prime contractor to the Air Force, Gen. Wood pointed out.

► **Air Force Responsibility**—"Even though the Air Force is contracting away and some of its contracts and development work to industry and available installations, it cannot contract out its responsibilities for the quality of new weapons, nor, in fact, for the effectiveness of the combat force as a whole. That is a military responsibility which we willingly accept and discharge.

"With your help and support, the support of our country will continue to be the best and most effective in the world," Gen. Wood concluded.—PK

Dallas Avionics Firm Gets PAL Account

Dallas Avionics Inc., newly organized company specializing in avionics design, maintenance and communications, will have the capability, maintenance and over-haul of all such equipment for Pioneer

Air Force. PAL now operates nine DC-3s.

The company, authorized distributor for Radio Radio equipment in Texas, Arkansas, Oklahoma and Louisiana, has a staff of 15 communications technicians, 2,800 sq ft of air conditioned floor space in Love Field, and complete test facilities.

Dallas Avionics is a CAA/FAA-rated radio shop without limitations, the firm says. William D. Pines, Jr., heads the new company.

Human Engineering Course to Be Held

Human Engineering Institute, a five-day course aimed at helping engineers factor human capacities and limitations into equipment design, has been scheduled for May 10 at Stoughton, Conn., by Dunlap and Associates, Inc., which held its regular course last year.

Some of the subjects to be covered include: proper design of controls, human perception (how information is obtained), man-machine dynamics, body responses (how controls are perceived).

Enrollment will be limited to less than 20 to facilitate conference discussion. The laboratory sessions involve groups will be formed and subjects will be allowed to provide materials of personal experience, according to Dunlap.

Companies which send representatives to last year's institute included: Convair, Radio Corp. of America, Office of Naval Research, General Dynamics Corp., and International Business Machines Corp.

More information may be obtained from Dr. J. J. Connor, Human Engineering Institute, Dunlap and Associates, Inc., 629 Main St., Stoughton, Conn. Tuition, including lunch, is \$300.

Thermal Element Activates Computers

A thermally sensitive computer circuit, which senses air density, pressure and humidity, permits sea and height reduction of 80-75% over conventional electronic mechanical techniques, is being applied to control subway computers (of underground railway) by Amco Corp. which developed the device.

The computing element's advantages make it attractive for use in many of the company's uses. It has perfect addition, subtraction, multiplication, division, differentiation and integration, of a.c. or d.c. functions.

Concept behind the thermal element was first conceived last year at the Airborne Electronics Convention in Dayton in a paper by Dr. Paul H. Smith, head of Amco's research group. Ac-



FREQUENCY MULTIPLIER (right) is used to speed level amplifier and control time constant. Transistorizing could cut multiplier size to half that of multiplying device (left).



THERMAL sensing computer element is simple, easy on wiring paths. Accuracy of the device is 0.5 to 1% Amco says.

Electric input signals which are to be operated upon are converted into heat which is then changed the resistance of temperature sensitive elements connected in a Wheatstone bridge arrangement to make the device relatively insensitive to air ambient temperature. Its speed heat transfer and provide a fast base constant, finding an application, says Smith. The combination gives a dual



For Printed Circuits

Very new Corbin members designed to work with printed circuit boards are available with two, four, or 16 pins each, and can be used, with or without heat or resistance use. It comes in three different packages for use with 1/4, 1/2, or 1 in. printed circuit boards. Construction is made by Corbin Components Co., 17944 Ramsey St., Northridge, Calif.

meets "a low level sensitivity," Amco reports.

The company is continuing development on thermal sensing elements and reportedly has several new techniques under investigation.

New Devices for Instrumentation

Several new device devices are especially applicable to instrumentation or telemetry units. Among those recently announced:

► **Measure pressure transducer**, with thin piezo film, is operating ranges as low as 1 to 1 psi, and as high as 6,000 psi, have a reported accuracy of better than 1% full scale, can be operated at temperatures of -65° to 350°. The pressure pickup has a natural frequency of 2 to 15 kc, depending on operating range. Units are available in several diameters, ranging from 1/8 to 1 in. Manufacturers: Dynisco Instrument Co., Inc., 25 Carlton St., Cambridge 15, Mass.

► **Subminiature audio amplifier**, Model AAW 9817, can provide gain of 18, 100, 100, at 1,000 Hz, input impedance of 2 to 100 megohms, with output of 2 to 20 v. Maximum supply of 100 v. frequency response, according to its manufacturers, Rhomac Electronics Co., Aircraft Div., 5236 East 16th Road, Downey, Calif.

► **Integrating commutator**, Model 18152, driven by a 20 v. d.c. motor, can be induced to customer's needs, providing up to 1,200 counts per second for high-speed sampling. Unit is made by C. M. Collins & Co., Inc., 70 Main St., New Bedford, N.J.

► **Subminiature audio amplifier**, Model 9817, provides up to 12 counts or high-speed integrating amplifier units for use with a variety of different transducers. Frequency response of linear integrating amplifier is reportedly 100 cycles/sec. 500 cps out to 5,000 cps, depending on mode and range of operation. General amplifier response is constant within 2% over range of 0.000 cps, acceleration over 100 g. Manufacturer: Consolidated Engineering Corp., 300 N. Main Street, Vicksburg, Miss., 39081, Calif.

► **Proximity pickup**, Model 4908, for detecting linear or angular position, speed, or vibration frequency of moving metal components, either magnetic or nonmagnetic, without requiring electrical contact with the pickup. When sensing metal is in close proximity, pickup and associated control produce a constant d.c. voltage, load product of the speed of the actuating mass or pickup spacing, which drops to zero when a nonmetallic material (like a shifter) gets between act and ferris

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FILTER CENTER

►Power Turbine Sock—Western Electric is testing up to manufacture power turbines used at two north and reportedly expects to be in production this summer. A new open metal water-cooled turbine capable of handling 100 north is under test at General Electric, further evidence of industry's efforts to develop higher power turbines.

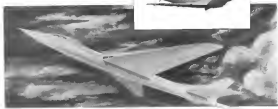
►Industry Times New Shield—Racov Instrument Co. and McQuay-Norris of Westborough, Mass. (Racov) will use new type tube shield, which reduces tube operating temperature, in production equipment. Instrument Electronic Research Corp., which developed the new shield (Aviation Week Dec. 14, 1953, p. 62) reports that half of the 22,000 shields sold to date have gone to companies which are evaluating their cooling capabilities. Shield is slated to become USAF standard.

►RTCA Joint Meeting—Radio Technical Committee for Aeronautics will hold joint meeting in Philadelphia, Apr. 22-23, with The Franklin Institute Labs, and the Philadelphia sections of the IRE and IEEE (professional groups in communication and navigational electronics). First day will be devoted to technical papers on new developments in aircraft, airports and air traffic control systems. Second day will be devoted to training, test, magnetic navigation, airborne and ground radar and automatic controls. Meeting will be open to non-members.

►New Potting Material—A new epoxy type electrical insulating resin, which can be made up in larger batches and kept for three days at room temperature without setting, has been introduced by Minnesota Mining & Manufacturing Co. Called Scotchcast No. 7, new resin comes in two part liquid form, has a cure time of only two-four hours at 250°F, longer at lower temperatures. Company recommends new resin for potting and for impregnating coils, and it has dielectric strength of 1,000-1,500 v./mil. in thin sections, low dissipation factor over wide temperature range at frequencies of 60 cps to 10 mc. Toolhead bullets available from company at 908 Piquette St., St. Paul 6, Minn.

—JFK

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5-4 J47 500000 installed in 5-47 develop much greater thrust during take-off because of water/alcohol injection. A detour valve in water substantially improves operation and substance of engine components.

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Yet jet thrust augmentation—as a precise science—is still in its infancy. That's why General Electric engineers continue their search for ways to get simpler, more effective power when needed.

Excellent progress has been made at G-E since 1948. Company engineers perfected an afterburner for use on the North American Avionics F 800 Sabre Jet. A G-E water/alcohol injection system

has been developed to provide added take-off thrust for Boeing B-47 Strategists.

New G-E augmentation systems (now under security restrictions) are available to the U.S. Air Force and Navy. By continuing to compare, analyze, and apply engine combustion data, G-E engineers are rapidly developing even newer methods.

Our jet representatives will be glad to discuss with you what General Electric is now doing in the thrust augmentation field. Contact your nearest G-E Representative Sales Office. Address: 230-PA, General Electric Company, Schenectady 5, N. Y.

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AVIATION SAFETY



BACK TO SCHOOL go USAF pilots to learn about flight safety at USC

Pilots Go to College for Safety

USAF sponsors six-week course for flying officers at USC as part of plane accident prevention program.

By Bernice Long

Los Angeles—Air Force pilots are going back to college here to learn about flying safety in the only non-costly program of its kind in the nation.

Sponsored by the Air Force Directorate of Flight Safety Research, the University of Southern California is pioneering this new field of aviation education.

The program is designed to train USAF pilots to a uniform professional level for use in flight safety offices and to give aircraft accident prevention its proper emphasis within units of the Air Force.

Industry Interest—Success of the program with Air Force officers has been so apparent that many aircraft companies and commercial airlines have expressed their desire for a similar flying safety course.

"It's our plan," says Dr. Louis Kaplan, teacher of Educational Principles and Methods, "to offer the accident duty as moving program, possibly beginning with the fall semester of 1964."

Numerous of the university to the aircraft industry, and the close liaison possible with the FSR Directorate at Norton AFB, near one of the major training USC was awarded the contract to organize and teach the program. The curriculum includes field trips to local aircraft manufacturing plants where students

learn advanced engineering methods and company safety programs.

A few weeks ago, less than a year after the first graduates were presented to 20 USAF pilots, the Air Force School for Flying Safety Officers graduated its 17th class from the six-week course.

Objectives—The course's objectives were outlined in the Flight Safety Research Directorate, under the command of Brig Gen Richard J. O'Rourke upon



STUDENTS LILI WEIBEL on lesson seatings, one of five in the U.S.

graduation, each student pilot is expected to possess:

- An understanding of Air Force Flight Safety methods and the ability to teach those methods
- Knowledge and skill in aircraft accident investigation
- An appreciation of planned and psychological factors in flight safety.

• An understanding of the current Air Force program

• Knowledge of recent developments in performance, survival equipment, materials, and personnel engineering on elevating the safety of flight

Everybody Helped—Before planning the course, USC gathered all segments of the aviation industry on flight safety requirements. Inquiries went out to flight safety offices on active duty with the Air Force. Opinions were solicited from the Civil Aeronautics Board and the Civil Aeronautics Administration. Commercial airlines and aircraft companies were asked for suggestions. Some literature and research findings of the major aviation organizations were used.

After analyzing the suggestions which resulted, the university drew up a six-week program with 50 academic class periods covering the following:

- Anatomical engineering, 72 class hours, accident prevention administration, 23 class hours, accident investigation and reporting, 43 class hours, aviation physiology, 15 class hours, education methods, 18 class hours, aviation psychology, 18 class hours, field trips to the Directorate of Flight Safety Research and to aircraft manufacturers, 14 hours, indoctrination on the human centrifuge, 32 hours

• The Training Staff—More than 100 educators were interviewed when the university drew up criteria and qualifications of the faculty.

Prof. James B. Vernon, USC faculty member and consultant engineer for the USAF General Manley Program, directed preparation of the aeronautical engineering course. This course includes aerodynamic forces and how they affect or cause aircraft characteristics such as controllability, control recovery and strength of materials of modern, high-performance aircraft, stresses and how this can cause material failure; inspection methods, study of engines, break down of accident causes by component parts, methods used to determine type of failure, and a complete rundown of all accident phases as they relate to accident causes.

Handling the aviation psychology course is Dr. Paul H. Evans, a former USAF flight surgeon. A study of the effect of stresses placed on the body during flight is the greater purpose of this course. In this question the human response machine, a test demonstrating the effects of acceleration is used. USC confining machine is a



How TIMKEN® bearings help the Sabre Jet absorb a 1-2-3 punch

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Barstair, 240 Volt, West Avenue 18, Los Angeles 16, Calif.



**Flexible Strip Coat
Resists Heat to 1600°**

Fidelity Chemical Products Corp. has developed a new "Strip-Coat" hot melt, stripable coating. It is particularly recommended for use when no oil or solution is required.

The material will not crack or slip on temperatures up to 1600°, the material notes.

Other features of the excellent weather resistant formula are: it is transparent, clear and retains deformability. The hot melt, stripable, rubbery thermoplastic strip flexible between -50 and 1600° F. serves as a replacement or stripable coating. For metal, as an insulating and potting material for objects not subjected to heat over 1600° and as a plating stop-off. It also has good concrete resistance, the company says.

The new Do-Pol #661 has a curing temperature of 360°F, and an application range of from 315-360°F.

Fidelity Chemical Products Corp., 473 Poughkeepsie Ave., Newburgh, N. Y.

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Height gage with dial in front of lens gives sight support for worker when measuring or scribing at close close to the plane of the surface marking and reading can start from bottom of the lens, with vertical scale set to zero. Re-designed vernier makes it convenient to read to .0001 in. with the added eye. Prices: measuring capacity 16 in.—\$47.50, 23 in.—\$47.50, 40 in.—\$47.50. George Schenck Co., Inc., 196 Lafayette St., New York 17, N. Y.

Trace-Meter is a high-pressure hydraulic control valve for use with vertical mills, spot mills, horizontal mills, bearing mills and other machine tools not able to counter balancing. It is simple to adjust to close tolerance work. Hydraulic Research & Manufacturing Co., 2535 North Noyes Street, Burbank, Calif.

Coated cable material used for drawing steel, aluminum and other alloy materials are of uncoated brass type. Steel cable includes 17 diameters, gauged from MN-453 to MN-1210 (0.410 to 1.310 in.). Special cable can also furnished to specifications—General Electric Co., Carlsbad Dept., Detroit 32, Mich.

Aluminum cones for wings, propellers, engines, windshields and nacelles, not only keep out birds, sand and dirt, but reportedly withstand most penetrating weather because of highly reflective aluminum coating and only weight 6 1/2 lbs. Trade name is Super-Flite—Cooper Industries #913 W. Fullerton Ave., Chgo.

Liquid floor coating can be applied on any type floor—concrete, metal or wood—and with strong enough overcoat for heavy traffic the next morning. First test is known as Test-Grip—Wilco & Williams Co., 130 Lincoln St., Boston 15, Mass.

Combination filter, regulator and lubricator for compressed air lines, called a flow-by-pass filter, type 32PL, is designed to eliminate overhauled piping and fittings required for installation of individual filters, regulators and lubricators. It simplifies piping, requires only two connections for attachment to any air line. Features claimed include maximum filtering area. Oil separator can be filled without shutting down air line, pressure is regulated and it is a shock-free, automatically blocking downstream line to atmosphere. Available in pipe sizes 1/2 to 1 in.—Roca Manufacturing Co., CCA Products Div., Baltimore 7, Md.



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Lee, Leonard Lee
Chief of Maintenance—Continental Car Co., Inc.

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"That's why I stick in the work for every item. They are completely dependable."

Also, Lee has approved maintenance of Continental Car Company's business fleet for 7 years. Last year they flew 3,000 hours in more than 400,000 miles. Lee was awarded a trophy of Continental Car Company.

Airflow
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JAN. 1968

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AIR TRANSPORT

SAS Reopens Fight for Transpolar Route

- Foreign press says PAA upset Los Angeles plan.
- But U. S. airline denies charge; reprisals feared.

By Frank Shen, Jr.

Scandinavian Airlines System has entered its fight for use of Los Angeles as West Coast terminal for its proposed transpolar route as a series of actions that promise to have wide international consequences.

Here are the latest developments:
 • **Hydromedusa from Norway, Sweden and Denmark** have called upon United States of State Walter Hallid Smith, acting State Department to reconsider its decision of last October that authorized SAS use of Seattle, but not Los Angeles. The airline holds that Los Angeles generates too heavy a rush European traffic at Seattle.

• **Leading Scandinavian newspapers** have accused Pan American World Airways of "trying to upset the applicant for SAS," stating that strong PAA influence was behind the initial State Department decision.

• **Both SAS officials and the Scandinavian press** have hinted at reprisals against Pan American that would cut off PAA flights into Scandinavian capitals.

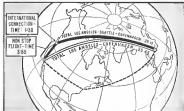
• **PAA Antisubmarine**—The U. S.-flag airline claims complete "independence" over reports that it in any way attempted to influence the State Department decision, holding that all action was taken by the U. S. government.

"At no time have we attempted to exert any pressure whatsoever," states a PAA spokesman.

The U. S. carrier holds the case is strictly between SAS and the U. S. government, and that Pan American does not wish to become involved.

• **False Plans**—Times of PAA's stand is indicated as a memo to the carrier's senior representatives in the Scandinavian countries from Harold Gray, executive vice president of the Atlantic Division. A copy was obtained by Aviation Week.

"Various sources of information have indicated that certain elements of the Scandinavian press have implied that some of the difficulties SAS is having in obtaining a certificate to operate into Seattle, San Francisco and Los Angeles, and even into other ports



SAS shows that differential, using Los Angeles over Seattle is minimal for transpolar route. Listed here would route to Copenhagen, using combined domestic/international service.

of the world, are due to opposition on the part of Pan American.

"It has even been suggested that I should make a statement to the press with respect to this. However, I cannot do this, for I have limits and restraints by taking any expression of this whatsoever in an official statement to the press. nor would it be appropriate for a privately owned company to state statements with respect to a subject which is being discussed and decided between our government and other governments."

"It is ridiculous to assume that any powerful, neutral company in a country such as the U. S., which has not one but 17 major airlines, could pressure to influence a decision which should be, and I am sure will be, based on national policies rather than the selfish interests of any privately owned airline."

"I am sure that each of the addresses of this memorandum understood these facts, and I suggest that you take steps to insure that all of our employees understand them as well."

• **U. S. State-Dept.** Department officials had no comment to make on the matter at press time. Government sources noted, however, that the department's thinking on restoring the initial Seattle decision was that granting SAS rights in Los Angeles would be prejudicial to U. S. domestic service.

The U. S. apparently believed in SAS Los Angeles operations would divert west-coast domestic traffic where European-based passengers use the domestic trunkline for trans-Atlantic connections.

• **SAS Viewpoint**—fighting its case for Los Angeles for the second time, SAS holds strongly to its original argument. The carrier contends that the difference between profitable and economically responsible operation lies in the selection of Los Angeles over Seattle and that this selection will be of best public interest and also benefit other airlines.

• **Shed SAS arguments** are:
 • Los Angeles now generates too much rush European traffic in Seattle. Due to the economic nature of the markets, the future potential from Los Angeles shows an even larger rate for transpolar operations.

• The California economy area has the type of industry that produces many national business travel, such as motion picture, television, radio and aircraft industry. Seattle industry, dominated by lumber and mining, produces far less international travel.

• Visitation travel is in direct ratio to population, plus other factors. California has 16½ million people, Washington 5½.

• Los Angeles industries produce a high ratio of international cargo, compared with a negligible volume from Seattle.

SAS also holds that its transpolar operations will not divert traffic from existing airlines but will serve to increase their traffic. The carrier claims no danger of duplicate routes, stating that growth of Alaska Airlines as it plans shows an opportunity for international sales that at yet show no sign of a limit.

• **Pan American**—Three factors in fact

- would handle other carriers, say SAS.
- A competitive fare applies only to the coastal area. Transatlantic routes the fare would be lower via New York.
- Since a passenger can go transpolar one way and trans-Atlantic the other for the same fare each way, new intercontinental travel will create new trans-continental value.
- Due to fare levels, average return to domestic lines adding transpolar tickets will approximate \$100. This includes 7% commission on the international side plus the fuel on their own lines so both the largest trunk and smallest local service airlines could grow from the added market.
- **Shannon Travel Times**—SAS claims to have determined that extensive open-trail service that the direct chartered travel time for majority of passengers on the transpolar route will be from Los Angeles. The carrier determined average flight times ranging both Los Angeles and Seattle as terminal points, in a series of survey flights (see chart).
- Here are the average times around it on scheduled DC-6Bs:
 - Los Angeles-Seattle fastest routing, 7 hr 55 min.
 - International connection time lapse, 1 hr 30 min.
 - Seattle-Copenhagen elapsed time, 21 hr 50 min.
 - Total time Los Angeles-Copenhagen via Seattle terminal, 28 hr 15 min.
 - Total time Los Angeles-Copenhagen direct, 35 hr 45 min.
- This leaves a time differential of 1 hr 30 min between Seattle as Los Angeles, reaches SAS.
- **Schedule**—Promote-In addition to suggesting possible repeat against Pan American if SAS is not given favorable consideration on Los Angeles, Scandinavia news newspapers are promoting the sale in strong terms.
- Some typical examples:
 - **Stockholm's Tidningen** . . . "There

is quite a strong opposition to economic and that is why the Scandinavian governments have not hesitated to give SAS, through joint diplomatic agency, all the support they can render in its struggle for its rightful status as a non-protected American competitive route. The battle for Los Angeles' new route is subject to serious selection at the highest American level. It is hoped that this time the issue will be treated in a way more founded on facts than hitherto.

"The American aviation company, we are sure, will survive even if the desired SAS is permitted to fly its 'route' planes to Los Angeles. . . ."

• **Oslo's Aftenbladet**. "It is a sad state of affairs SAS is experiencing these days, as that national border stands up into the air. . . . We hope the American authorities will follow the line not conducted by the European Airlines union in the field of international commerce, restricted trade, down with borders and barriers. To create new at atmospheric borders is somewhat meaningless."

• **Copenhagen's Politiken**. "A world spring, American aviation company flies from the U. S. to the capital of the three Nordic countries in competition with SAS—and what would they say to the U. S. if the Scandinavian authorities decline that the Americans could fly only to Albany."

"It is evident that the refusal of the American authorities is based on one intention for American island routes, but the apparent profit arises very far the world when one considers to what great extent American aviation companies also absorb the traffic on a great number of island routes in Europe."

• **Other Views**—New and diverse views are opinions have been alluded to in the SAS application. Some industry observers feel that SAS really wants to get into Los Angeles in order to use the

terminal as a point for a trans-Pacific operation to Tokyo.

Others repeat the view that, despite appearances to the contrary, the Scandinavia airlines actually may be seeking a means to drop the protected polar route, possibly having decided that it would not be as lucrative an operation as first thought.

U. S. refusal of the SAS request for Los Angeles some authorities say, would herald the nation for the carrier to get "seriously off the hook" as the polar route if it actually has decided it would be an unprofitable venture.

SAS is so good as facing the route would be abandoned if Seattle remains in the West Coast terminal.

It also has been thought out that public acceptance might not be too widespread for a fight requiring approximately 26 hr in the air.

SAS has one strong ally in the Los Angeles Chamber of Commerce. The body is most anxious to have the carrier serve that city, and indications are that the Chamber might appeal if State Department actions an adverse decision.

As yet, there has been no indication when a decision will come.

EAL Continues Fight For Colonial Merger

Eastern Air Lines continued its efforts to merge with Colonial Airlines last week in a formal move to Civil Aeronautics Board during six preliminary sessions of CAB, the point directed President Eisenhower to veto the move (Aviation Week May 6, p. 31).

The airline makes three points in its case:

- Eastern had no control of Colonial at the time (April 1952) that the stock holders of the smaller carrier refused to approve a merger proposal made by National Airlines.

- EAL had no control over Colonial in September 1952, when CAA's stock holders approved by an overwhelming vote Eastern's purchase offer through an exchange of two EAL shares for three of Colonial.

- A merger has substantial public interest benefits.

- CAB accepted an easterner's "irreversible" findings that, because once irrevocably associated with Eastern and a number of others entirely unknown to EAL had acquired Colonial stock, the sum total of these market interest holdings represented "technical control."

- Technical control of Colonial is charged was not used in any way by Eastern in its relation with CAA.
- Answers to inquiries by Eastern show that Eastern's stockholders 19 1/2% and the far most stock will use 13 passengers



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TCA Prepares for Super Connie Services

First flight view of a 43-passenger Trans-Canada Air Lines' Wright T-43 Constellation-powered Lockheed Super Constellation being tested for start of service in May. This transport will fly TCA's trans-Atlantic route, linking Montreal with London, Paris and Düsseldorf, Germany. It

August TCA will introduce its Super Constellation on North American service. Seating arrangements consist of seven Super Constellation aircraft at once. Seats shown at the rear compartment and two seats in the lounge, which also has four seats. When fully equipped 39 seats and the far most stock will use 13 passengers.

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Cheaper Airline Trip Insurance

The announcement by Associated Aviation Underwriters of an increase in airline trip insurance limits for the same maximum premium marks another milestone in recognition of airline safety in this country.

Associated increased the limit on trip insurance policies from \$50,000 to \$62,500 on Feb. 12. This means that scheduled airline passengers now can purchase 25% more coverage than was possible before for the same \$2.50 premium.

Even before this reduction, Associated had pointed out that safety of scheduled air transport in the U. S. was proved when the conservative insurance industry would offer \$10,000 to 1 odds on a passenger's safe arrival.

The new rate schedule increases these odds to 25,000 to 1.

There are other advantages in the rate change not so readily considered. For example, the increased patronage of the machine dispensing trip policies will be an important consideration to operators of airports, for rental revenues from the machines will go up. Even before the rate reduction, there had been a tendency for more individuals to purchase the machines at airports rather than at machine stores, due to the change in policy, for example.

Trip insurance for airline passengers was begun in 1929. Originally, a 25-cent policy was sold for each four hours of air travel, because then a plane could cover about the same distance in four hours that a train could cover in 24 hours. At that time 24-hour train trip insurance policies were priced at a quarter. Since 1929, the air policy has been broadened repeatedly.

As an example of cooperation between insurance and air interests, Associated Aviation Underwriters cites the fact that Air Transport Assn. reserves the right to approve all policy forms, coverage and rates used on airline trip insurance, since ATA has always considered sale of insurance to be primarily a passenger service.

"For that reason," a spokesman points out, "the airlines never permitted Associated to pay kickback percentages a commission, as is the practice with mutual policies. However, after World War II, when man power was a problem and commercial aviation was rapidly picking up for those lost during the war, the airlines requested Associated to find some method of relieving their ticket agent personnel from the time-consuming sale of trip insurance. Associated began an experimental program with a fully automatic coin-operated machine to dispense the same policy which had previously been sold at airline ticket counters. These machines have been improved continuously since 1946, and they are now installed in 250 cities in the U. S., Canada, Alaska, and Hawaii."

These underwriters are proud of their claim that they were not only the first to provide airline trip insurance but also to offer it through fully automatic machines which attach a copy of the duplicate policy. "This is an important consideration since Associated Aviation estimates that from 75% to 85% of those issues are

paid without a claim having been presented." This the company says is due to promptness and thorough search procedure they institute following an accident. Good work!

Who Lost the Strike?

Despite a 54-day strike last fall, North American Aviation, Inc., reports its financial statement for the recent fiscal year ending last Sept. 30 should be at least as profitable as last year—if not better. This is a tribute to management efficiency and employee productivity.

As the company had forecast shortly after the strike ended, it achieved its pre-strike production rate in 84 hours, although it has not yet made up the slack in planes lost—even with the aid of a government stretch-out order. Actually, this loss of valuable Sabers to the military forces may not be wiped out before early July.

Who lost the strike?

The military suffered reduced deliveries of the potent P-86.

The non-union lost total wages of \$16,783,803, or an average of \$984.44 per employee.

The union lost about 6,500 members who resigned during the time there was no contract.

The new contract provides for maintenance of membership instead of the modified union shop which North American had for three years. So these workers can remain out of the union if they desire.

Who lost the strike?

Weather Ships Stay on the Job

Official decision to retain nine North Atlantic weather stations is good news to trans-Atlantic sailors and their pilots.

Earlier, Washington officials had decided that U. S. financial support would be drastically reduced and the program was nearly scuttled. But in an emergency conference of International Civil Aviation Organization in Paris, 11 other nations and the U. S. have agreed a two-year agreement, relinquishing their shares of operating costs for new stations, requiring 11 ships for unimpaired year-around service. Only one station will be eliminated.

The U. S. government had taken the position that it no longer could contribute \$17 million a year, about half the program budget.

These ships, scattered over the ocean at designated stations, offer important communication and navigation links with air traffic, furnish quick and dependable weather data, and are always on standby duty in case of emergency distress.

They are considered so important to aviation that the ICAO conference assessed operational benefits at 85% of the program's value, and non-operational benefits at 20%.

Such an expedition and important decision as this is a commendable example of teamwork by ICAO.

—Robert H. Wood

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pace with the industry. It has conformed to meet the increasing demands in the fields of fuel metering, landing gear, wheels and brakes. Bendix sets the pace by developing making possible greater speeds, heavier loads and increased safety.

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